

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

INFORMATION PROCESSING
SOCIETIES
INTERNATIONAL

NEWS
PAPER



Effort to License Programmers Fails

LOS ANGELES — The effort to license programmers in California has all but dissolved because of a shift in legislative assignments and a lack of any unified support.

State Sen. Alfred H. Song (D-Montgomery Park) who had been chairman of the Senate Committee on Business and Professions, which handles licensing legislation, had proposed the licensing of programmers following a study alleging faulty security during "auto" — a primary section of Los Angeles' code.

But Song got another legislative assignment and no one else took up the effort.

Herbert B. Safford of Santa Monica, executive vice-president of the Data Processing Management Association, said the attempt at licensing was a little premature and should have been years before licensing can become effective.

But he definitely thinks licensing will take place and that "we should have a way of uniformly certifying people."

He also asserted there was a lack of any support from professional organizations.

IBM Modem 'Integrable' And Priced Competitively

WHITE PLAINS, N.Y. — IBM has an "integrated modem" operating at 1,200 bits/sec that can be installed in the 2701 line adapter, the 3735 programmable terminal and the new 3705 communications controller. The device is priced at levels offered by AT&T and independent suppliers.

The modem can operate on both leased and dial-up lines and features an auto answer capability. Auto dial is optional available on the 3705 and 2701.

Monthly rental starts at \$15 for private lines and \$20 for dial-up facilities with purchase prices of \$525 and \$700. The modem for the 3735 and 2701 will be available in July 1972, and for the 3705 in March 1973.

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Opens Next Week

Afips 'Optimistic' About '72 SJCC

By Edward J. Bride
of the CW Staff

ATLANTIC CITY, N.J. — A highly varied technical program and a surge of last-minute interest from exhibitors may help draw 15,000 to 20,000 computer users and technicians here next week for

the Spring Joint Computer Conference, officials from the American Federation of Information Processing Societies (Afips), said.

The semiannual JCC's are "highly optimistic" about this conference, to be held May 16-18.

The technical program, with only 130 regular panel discussions, will feature 130 papers, almost double the normal, officials noted.

There will also be special presentations for computer users, including a clinic on computer security on Thursday morning, and two evening sessions Wednesday, one on program documentation and the other on research in a university setting.

The exhibit hall is expected to feature about 150 organizations in some 300 booths, Afips said. This represents a continuing drop in both the number of companies exhibiting and the size of the equipment; two or three years ago, companies would lease an average of more than three booths each, while this year it is about two.

"One per booth."

In the last two weeks, a spokesman related, an average of one new exhibitor per day has signed up, bringing the preliminary total to 142.

Predictions on the financial viability of the JCC's have been both gloomy and rosy over the past several months, but Afips is confident the 1972 SJCC can still be profitable.

Those more interested in JCC profits are

(Continued on Page 2)

Itel 370 Lease Plan Saves Up to 60% Over 8 Years

By a CW Staff Writer

SAN FRANCISCO — Itel is now offering a Packaged Lease Program on IBM 370 equipment that gives the user the same type of discounts that were available at the height of the 360 lease boom. With the plan, which involves leasing a 370 with Itel peripherals, the user can get a discount of up to 15% over what he would pay in IBM rent on a three-year lease; a discount of up to 40% on a five-year lease; a discount of up to 60% off on an eight-year lease arrangement.

In dollars, the savings can be huge. On a four-year lease of a 370/135 with 96K of memory and eight 7330 (the Itel 3330-equivalent) disk drives the savings would be \$5,600/mo; and on a 165 with 2 Mbytes and 16 spindles it would be \$41,000/mo on an eight-year lease.

Itel says its lease plans written for IBM 370 equipment were full payout plans where the user paid the full price of the equipment over a five- to eight-year period.

Savings Depends on Lease

The new three- to eight-year lease plans are available for any of the presently available 370s and the amount of savings depends on the length of the lease; the type, model and configuration of the 370 system; the type and amount of Itel peripherals used with the system.

The more Itel equipment — both disk systems and main memory — used with the system, the greater the discount.

The renewal terms under the Itel "very liberal," according to Itel. The user can renew his lease on a month-to-month basis at the end of the set period, and continue to receive the same discounts.

If the user renews for a full year, however, he receives an additional 15% off his lease price. The second and third year he receives an additional 15% off.

The plan includes purchase option plans

which are described as "extremely liberal," even though the company would not disclose details.

A user can terminate the agreement after one year, but the charges are rather steep.

(Continued on Page 2)

FTC Blasts EDP School Advertising

By E. Drake Lundell Jr.

Of the CW Staff

WASHINGTON, D.C. — Three major chains of computer programming schools were cited last week for deceptive and unfair advertising and sales practices by the Federal Trade Commission (FTC).

The commission was careful to note, however, that its proposed complaint did not question the quality and content of the training itself.

The FTC was quickly branded as "nothing more than the too frequent 'wave the checkbook and make headlines' approach to solving problems," by William Norris, president of Control Data Corp., whose Control Data Institutes were involved in the action.

Spokesmen for the other companies involved — Laser Career Centers and Electronic Computer Programming Inc. (ECP) — withheld comment until they had more time to study the documents.

The commission also said it may order the three firms to refund tuition fees to present and past students who couldn't

(Continued on Page 2)

Get the Vote



ICW Photos by F.J. Plasta

Telephone workers at National Election Service headquarters in New York City are shown preparing for results from the primaries. Keypunchers then transfer vote counts to cards with error rate of under 1%. Twin 360/50s process the returns. The output to the news media is then monitored. Story and other photos on Page 3.

FTC Hits Advertising, Sales Practices of DP Schools

(Continued from Page 1)
find work after taking the courses.

The commission said it intended to file complaints against the three alleging that the following typical claims are unfair or deceptive "because there is no reasonable basis to support their validity."

• Graduates of Control Data Institutes will qualify for data processing positions at salaries that match or exceed the salaries of recent college graduates.

• There is an urgent need or demand in the field of DP for graduates of Lear Siegler Computer Centers.

• ECPI schools each year place thousands of their graduates as computer programmers.

The FTC also alleged that the companies used advertising and sales practices which "a reasonably prudent person

should have known were deceptive or unfair in order to induce persons to pay over to the firms substantial sums of money to pursue courses of instruction whose validity . . . for future employment was virtually worthless."

The companies' failure to make or offer refunds to students who couldn't find employment for which they were trained "is unfair," the Commission stated.

Figures Secret?

Furthermore, the FTC action alleged that the companies failed to disclose the percent of the graduates of each school who obtained employment; the employers that hired such graduates; and the initial salary of the graduates.

This information, FTC said, would be likely to affect the potential student's decision to enter the school.

Other allegations from the FTC include:

- Placement percentages were misrepresented.

- The companies' placement offices did not schedule employment interviews as required.

- Courses offered by the companies did not prepare for high-level programming positions as represented.

- Control Data and ECPI's advertisements deceptively represented that a college education was not necessary for placement in the DP field.

The proposed commission orders would prohibit the alleged misrepresentations and require the firms to disclose their placement percentages; employers hiring graduates and the starting salaries.

The firms presently have 10 days from the date of the pro-

posed complaint (May 2) to enter into consent negotiations with the FTC in which they would admit no guilt but promising to correct the alleged misrepresentations in the future, the FTC said.

If the firms do not enter into consent negotiations, the FTC would then file a formal complaint which would be heard by FTC examiners and then five FTC commissioners as possibly soon as June 1 if the firm fought the decision of the commission.

In all, the FTC said the companies operate or franchise around 130 schools. Of these, CDC operates 14 schools, direct and through eight franchises; Lear Siegler has 16 company-owned schools and ECPI operates seven schools and has 80 franchises.

The average tuition for courses at the schools, the FTC said, is between \$1,000 and \$2,500, and

the schools offer courses for computer operators, computer programmers and computer technicians.

In response to the charges, Norris said "the issues which the FTC is addressing with Control Data could have been resolved over a year ago by meeting with us as well as other vocational schools and then we could all now be enjoying the benefits from such a meeting."

"It appears that the FTC may attempt to penalize the private computer vocational schools because of the difficult some of these students experience during the initial two years in finding job difficulties which appear to be directly related to the slowdown in our whole economy."

"I am even more concerned that the FTC may create policies applicable to private education which would be aimed against such education in comparison with public universities and other tax-supported schools."

Grade Bave Problems

"Many graduates of leading colleges and universities throughout the country experienced difficulty in finding jobs last year. I hope the privately owned computer schools will not become a stalking horse because their students experienced comparable difficulty," he added.

"It is not feasible to respond to all the allegations contained in the FTC complaint," Norris added, "however, there is one allegation in the complaint that is so erroneous that it must be corrected now before it is misconstrued by millions of people depending on it for their view."

He said that the FTC's representation that college education was not necessary for placement in the field of electronic data processing.

"It is a fact that we have graduate placed thousands of high-college graduates from our Control Data Institutes," he said.

Afips Optimistic About Next Week's JCC

(Continued from Page 1)

the Afips societies, which rely on financial distribution from Afips as their chief source of revenue. The society that has the most is the Association for Computing Machinery, and ACM President Walter Carlson does not share the Afips optimism.

Carlson is currently involved in a three-month series of editorials entitled "Unfinished Business,"

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WALTER BOYO, publication manager; PATRICK J. McGOVERN, q

appearing in the ACM monthly *Communications*. In the May issue, he claims "the 1972 JCC is budgeted to produce the first financial loss at a JCC in Afips history."

ACM has called for a "short-term reevaluation of Afips operations," Carlson said, and "possible return of some of Afips responsibility to the member societies."

Afips denied that a financial loss is unavoidable, but did concede that the financial and operational predictions would not be met. Funds are distributed to the societies on a fiscal year basis, the spokesman added, and not after each JCC.

To further meet the needs of the JCCs, Executive Director

Forecasting Expanded

Special to Computerworld
MELBOURNE, Australia — The Federal Bureau of Meteorology plans to streamline its operations with a centralized forecasting service in Melbourne.

Forecasts for all services, including aviation, will depend on a central computer here with regional forecast centers in all Australian States and Territories and the Territory of Papua-New Guinea doing preparatory work.

The forecasts will be issued to the Greater Melbourne Area Borough School District and the patrons are the 35,000 youngsters who eat lunch — 2,614,295 lunches a year — at the district's 50 schools.

Cutting Costs in Alaska Big Deal

Klinger, assistant superintendent for facilities and finance.

"Therefore, the more efficiently we can operate our support services, the more resources we can spend on actually educating our children."

"Because of our steadily increasing size and the costs of maintaining a large school system, we must become more scientific in our operations," Klinger said.

By keeping track of the fluctuating prices of various food commodities, the IBM 370/135 will quickly sift through alternatives to find the best nutritional value. The system will print a menu of various foods to purchase, the quantity needed to prepare each meal for the district's students and will prepare a daily menu that assures a balanced meal composed of foods that go well together — and at the least possible price.

Plans Buses

The school district also operates the largest bus line in Alaska and will use the IBM system to assist in calculating the most efficient routes for more than 100 school buses that travel an estimated 1.3 million miles each year across the 80-mile-long district.

"Our prime business is educating youngsters," said William W.

Bruce Gilchrist eliminated the Afips staff position of exhibit director, formerly held by Don Cruzin, and has given this function over to two separate groups: "communications" and exhibitor relations.

To try and put the current computer industry challenges into perspective, Afips President Keith Willcock will deliver a "state of the industry" address Wednesday morning at 9, in the main atrium of the Convention Hall.

In reference to the past heyday of the computer industry, Uppercase said his address would deal with the 1970s and the "ability of our industry and profession to respond constructively to a new set of conditions."

Registration, Program

The registration and activity schedule for the SJCC begins Monday at 5 p.m., at Convention Hall, continuing until 9 p.m. Registration on conference

User Can Save 60% on 370 Lease Plan

(Continued from Page 1)

For example, if a user terminates after three years on a five-year plan, he has to pay 48% of the original cost of the equip-

ment; if after the fourth year, the charge is 25% of the original equipment cost.

But a user can upgrade to

370/145 with 208K IBM memory and add 12,730 spindles

Term	% saving/mo	\$ savings/mo	approximate IBM monthly rent
3 years	2%	\$540	\$27,000
5 years	36%	\$9,720	\$27,000
8 years	45%	\$11,150	\$27,000

another 370 (or even downgrade to 360 equipment) with minimum charges. And the upgrade will not cause any cash outlay to the user; the charges will be added to his new lease.

Generally, these charges would only add approximately 1% to the new lease, Itel said.

In addition, any termination charges can be applied to the purchase of the old equipment, or a user can pay a premium to pay a \$100,000 termination charge, he can apply that \$100,000 to pre-

lease plan by reimbursing the user for any charges he incurs getting into the plan, i.e. charges for term equipment and equipment on a fixed-term plan.

Itel will also continue to offer rental credits for any time a customer incurs losses due to hardware malfunctions, as it does on the leases it writes for IBM.

The firm said it would also take older equipment as trade-ins for users who own their own equipment.

Term	% saving/mo	\$ savings/mo	approximate IBM monthly rent
3 years	6%	\$2,700	\$45,000
5 years	35%	\$15,300	\$45,000
8 years	54%	\$24,300	\$45,000

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Team of Thousands Gets Election Facts to Networks, Other Media

By Frank Piatta
Of the CW Staff

NEW YORK — Ever wonder how the nation's new media can come up with accurate voting results only minutes after ballots are counted in the national elections at the national press center?

The National Election Service (NES) here stresses speed and accuracy while providing the three major television networks and two major wire services with the data for early election results.

NES was organized after the 1964 pri-

cluding reporters at the local precincts and operators and programmers (with twin 360/50s and a 360/20), work round the clock to get the facts.

DP facilities were located in the Group Health Insurance, Inc. building, where NES uses equipment normally part of the insurance company's system.

When the local vote counts are available, results pour into the New York headquarters via 110 telephone lines. Before the job is finished, approximately 7,000 calls will be received, 90% of them between 8 p.m. and midnight.

Tallys from precinct and county reports are punched onto 80-column cards, sorted and transmitted down 14 stories over an IBM 1013 to the computer room where cards are repunched. The punched cards are read into both of the 360/50s where the data is completely verified and then included in totals kept by precinct and county.



The operation of the error desk can be compared to a fire department — periods of relative inactivity punctuated by moments of "heavy action."

The 360/50s operate on the same data

simultaneously, so in case of trouble the cutover from one system to the other can be accomplished almost instantaneously.

The results of the tabulations are dispatched over Teletype 28, to the national centers of the five members and to NES regional offices in each state.

Reports are produced at frequent, specified intervals including state totals for each candidate, with separate reports for each party every two minutes, and county/city totals for every candidate every 15 minutes. Tallying of each of the delegates are also issued at frequent intervals.



Executive Director J. Richard Elmers checks control figures during vote count: many elections by ABC, CBS and NBC and AP and UPI. Costs are shared equally by the five members. Only eight people are employed year around, but temporary hiring at national election time can swell the figure to 145,000.

During the current series of presidential primaries, a team of nearly 7,000, in-



Jeffrey I. Stoll, systems manager, and Robert Fisheerty, director of operations, interface frequently at the counting premises.

Information System Curing Paper Disease

LITTLE ROCK, Ark. — A computer-based information program in the Baptist Medical Center System makes it easier for doctors, clergy and friends to visit patients, and at the same time, relieves hospital personnel of an expanding administrative workload.

Using a computer with CRT terminals, the 590-bed Medical Center System is in the second year of a five-year plan to develop a total hospital information system.

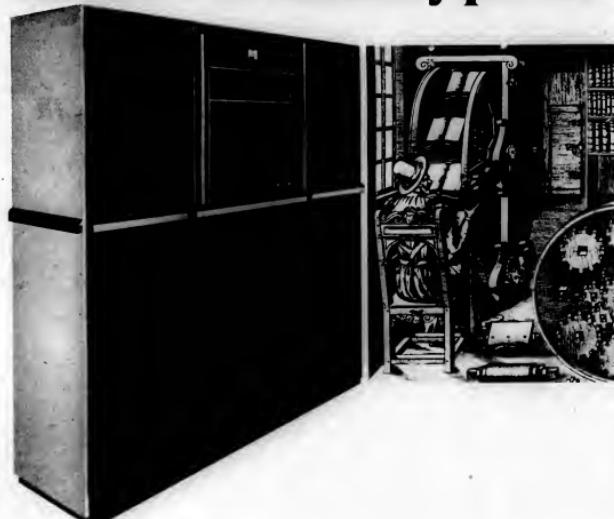
The CRT terminals provide patient information obtained only manually before and on a more-up-to-date basis.

For example, a doctor beginning his day's rounds can obtain a complete patient listing by entering his ID code on the computer terminal.

Similarly, a terminal at the information counter is available to visiting clergymen. The computer can scan admitting data provided by patients and identify for a minister all members of his church and their room numbers.

"But these are only early byproducts. We are now attempting to automate all the paperwork, from the day a patient is admitted to the day he is discharged," according to Don Moore, director of computer services.

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memory to get more out of your computer. Use ARM to double or triple your memory capacity, get more done with your present computer. For example, ARM-22 can expand the 360/22 to 64K; ARM-30 can expand the 360/30 to 128K; and ARM-40 can expand the 360/40 to 512K. The ARM-50 works to one and one half million bytes. Economical, too, on purchase or lease.

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To Identify Users' Rationale

**By Donald Levitt
or the cw staff**

MIAAMI — For the first time, next week's Guide meeting will give users of non-IBM software products a chance to discuss those packages and how they relate to IBM software, within the context of a formally organized user group meeting.

The External Products Project is expected to be primarily concerned with data base management systems but may consider related software as well, consider to Ronald J. Cotyk of Westinghouse Electric. Cotyk was named project manager at the last mini-Guide meeting.

Users' Rationale

Stated purpose of the project, President Garland Capp

of McDonnell Douglas said, is to identify the user's rationale for using non-IBM software products. Findings would "presumably" be passed along to IBM with other Guide input, he added.

Apparently reflecting the longstanding exclusion of discussions of non-IBM software within the user group meeting itself, Cotyk's project meeting is classified as a Guide Additional Program Session.

The new project has a position comparable to established projects concerning IBM's CICS, IMS and GIS packages, within Guide's Information Management Group, Cotyk noted. The Miami meeting is particularly important since it will set the objectives and structure of the

project, he added.

Cotyk stressed that the meeting is intended for users and not vendors of "external" packages. Guide is the IBM-sanctioned user group for large-scale systems such as IBM 705, 1401 or 7090 series computers, at least 10K of core and six tape units, or 360 Model 40 or above, with 64K bytes of storage.

Real Work Needed

The meeting will consider both short- and long-range objectives for the External Products Project. Hopefully, target dates for short-range objectives, and interim check points for longer effort will be set, so that real work can get underway, Cotyk said.

The structure of the project,

including the organization of committees and the selection of alternate managers, should be relatively easy to resolve, once the basic purposes are set, he added.

Cotyk hopes the meeting will

set an agenda for the project meeting at mini-Guide 34.5, including a definition of what subjects might be profitably discussed, and what information might be needed as resource material for the discussions.

News Wrapup

Canada Insurers Want More DP Use

TORONTO — A group of 10 Canadian insurance companies has formed an association dedicated to the use of standardized computer-based information systems in the insurance industry.

The Insurance Systems Association plans "to provide technical assistance to members and member companies and to investigate and report on systems developments and costs," according to chairman Walter Sulzberger.

Through the group, he said, "we hope to see improvements in such areas as costs, training, agency contact, forms design, systems design, problem research, organization and others."

The association plans to expand its membership through invitations to non-member companies.

Codasyl Seeks New Input

PHILADELPHIA — Users who have worked with data base management systems can attend the annual meeting of Codasyl (Conference on Data Systems Languages) in Tucson, May 23.

The Data Base Task Group is seeking "as much input as it can get," particularly about a common data description language, according to Jack Jones of Southern Railways and chairman of Codasyl's Executive Committee.

If the group can arrive at a consensus of what the language should contain, "it would have broader impact on the entire computer community than the work done by Codasyl on Cobol," Jones said.

The meeting will be at the Drexel University Activities Center, 33rd & Chestnut Streets. Advance registrations, costing \$15, are being taken by W. Ronald Block, 1515 Pennsylvania Bank, 3020 Market Street, 19104.

Aid for Adoption Expected

ST. LOUIS — A computer system might find homes for 40,000 children in foster homes and institutions and insure that the needs of the backlog of children be met within this decade.

This is the feeling of the delegates to the Third National Conference on Adoptable Children who met here and resolved that federal funds be provided for a national computer count of children.

The Care of His (Its) Choice

LONDON — For those indecisive souls who cannot make up their minds as to what car to buy, the answer may be off.

Programmers at Gordon and Gotch Computer Center have written a "demonstration piece," the Selectcar Service, which relies on a master file in the center's computer. There is data on and performance details of more than 100 British and foreign cars, plus U.S. makes.

By typing in an inquirer's needs on a terminal an operator can have a short list of the models most closely matching his requirements produced by the computer.

Yale to Honor Cmdr. Hopper

NEW HAVEN, Conn. — Commander Grace M. Hopper, one of the pioneers in the computer industry and internationally known for her work in computer programming, will receive the Wilbur Lucius Cross Medal from the Yale Graduate School's commencement exercises here on June 12.

The medal is awarded annually to graduates of the Yale Graduate School for outstanding achievement. It is named after a former dean of the Yale Graduate School.

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Study Finds 360 Desirability

Most Users Happy With 370, But Rate Backup Poor

CHICAGO — Of the over 350 major corporations participating in a recent study, 30% decided not to move to IBM's System 370. This was one of the findings presented to over 200 executives attending The Diebold Research Program's 27th plenary meeting.

The results of the study of users' experience with the IBM 370 were presented by Basil Iwashyna, senior associate, The Diebold Group, Inc.

Since June 1970, when IBM announced its 370 line, almost 2,000 of these systems have been delivered. The 100 companies deciding not to move to System 370 gave these reasons:

- Ten percent of these companies had no need for the expanded capability of the 370; existing machine capacity was adequate for their work load over the next four years.

- Ten percent were non-IBM users, particularly NCR and Burroughs users, who

are not moving to 370 because of lack of direct compatibility or emulation.

- Eighty percent were those 360 users who found alternative means of achieving cost/performance advantages equal to the 370. Some found that through financial arrangements with IBM or other system providers, it was possible to configure systems which were more effective in terms of cost/performance than 370s.

One of the case studies was that of the B.F. Goodrich Co., Edward J. Jeffer, director of computer equipment resource planning and control, indicated his company had gone from a 360 to a 370 but is currently returning to the 360, mainly because of availability of attractive financial arrangements with IBM.

Jeffer said that even though the 360 performance has not been changed, effective cost/performance due to reduced pricing (as much as 60%) made the user

360s desirable, if cost/performance is the major criterion.

Jeffer also said that since the 370s lack any software advances, many users can stay with 360s. This same factor, however, makes upgrading easier, with no conversion problems.

The study also examines 370 user experiences and satisfaction in specific categories. Among them are:

- Systems performance — Most users participating in the study felt that system performance exceeded expectations. The study found, however, that 165 user satisfaction was lower: these are extremely knowledgeable users — and they feel that IBM could have done more to improve system performance.
- User satisfaction with the software was lower: these are extremely knowledgeable users — and they feel that software is well within IBM's capabilities.
- They feel IBM should have introduced a new and improved operating system for

- 370.
- Backup — If the system is down, a user must have backup, an alternate system available from IBM, or an IBM user in a nearby city with whom both the 165 and 155 users are dissatisfied with backup availability. The study thought this was because there are not enough 165 and 155 users yet.

Other conclusions of the user study are:

- Most 360 programs will run on 370s with no changes.
- File conversion from the 360 to the 370 is not a problem.

- Operations staff trained on the 360 will not require significant retraining.
- On the average, throughput of respective 370 models will exceed expectations.



In a computer room at a Puerto Rico engineering firm, Chief Engineer Herman L. Guillarmey (left) and Pedro B. Ortiz use a computer to design highways for Puerto Rico.

Engineers Smooth Road-Building Task

SAN JUAN, P.R. — If it weren't for the computer, Puerto Rico's new superhighways might still be the "drawing boards."

The island is midway through a five-year, \$680-million highway construction program and computers have figured in every mile.

Most of the current projects are under way, and the engineers are working on the island. The chief engineer of one of the firms, Herman L. Guillarmey, said that, beyond a guess of "thousands of hours," it would be impossible to determine exactly how much time his computer has saved him and his company on highway design.

Guillarmey and Ortiz designed two segments of the San Juan-Ponce toll highway — the 10 miles between Rio Piedras and Caguas and the 25 miles between Salinas and Ponce.

"The computer is a quick and inexpensive proving ground," Guillarmey said. "We can test our design against standards we specify ourselves in a digital terrain model we build ourselves inside the computer."

"Once digitized, terrain data can be used for small line adjustments or major line shifts. When design changes are necessary, we can make them easily and economically."

The detailed terrain model in the IB110 is a engineering cross-section of the proposed highway route.

Engineers can vary their design almost infinitely by changing the specifications on punched cards and feeding them into the computer. The computer will automatically adjust other parts of the highway design to compensate for changes to one part.

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THE LEADER IN LEASING

Playing Politics in Government Agencies

Problems Are Unusual, But 'Open Mind' Is a Necessity

By Molly Upton
Of the CW Staff

MONTEREY PARK, Calif. — "Governmental agencies have to realize this (sharing) is the only way they're going to really be able to use computers," according to Sam Norris, manager of the San Gabriel Valley Municipal Data System (MDS). Thirteen cities participate in the system, which was originally designed to accommodate about 19 municipalities.

Norris knows the benefits of a joint system but he also knows that getting a shared municipal data center up and running, and keeping it running, can involve problems not necessarily encountered by a private bureau or by the DP center of one city.

Political Problems

In setting up a shared system, political problems must first be tackled, Norris said. "Before you get into technical con-

siderations, you have to find a common way to meet and make decisions. If you talk about two agencies that have a long-standing rivalry, they're just never going to make it, because it will permeate any relationship they have," he observed. "So you try to find a common mind as to who you can cooperate with. Look to different types of agencies, such as a county, school district and a city. The

shared-use concept to other councilmen.

"One of the biggest problems we have in selling cities is the bad reputation DP has in the cities, because they have made mistakes in the past without adequate study or staff commitment. They will buy the hardware, but never agree to put the people in."

"For instance, the thought of a city hiring a 28-year-old analyst and paying him as much as a police chief is totally unacceptable to them."

That is the problem of conveying what is meant by the long-term development of a DP system. "To a city person a big project is laying a street that takes 120 days and is a fixed-price contract. He has no concept of a cost-type of contract that runs over three years," according to Norris.

"You're selling a future type of thing," he added. "Asking for \$30,000 in return

for a system in 1972 didn't sound very good back in 1968."

MDS currently sells time to a private developer-supplier, Norris said. Norris said if there were 19 cities, financial problems would be lessened. MDS serves a population of about 450,000, and Norris would like about 700,000.

Norris does his best to keep the non-DPs informed with seminars, Saturday morning clinics and progress briefings to city officials.

When dealing with councilors, rather than city managers, MDS has access to other council members, and thus can involve the legislative people directly in the decision-making process.

The representative board of the cities operates on a one-city-one-vote rule, but Norris admits that if a bigger city wants something, it tends to swing a little more weight.

User Groups

There are user groups in each application area, which help to determine what programs they would like developed. "They say they'd like something, and we will tell them how much it will cost. We work for them, and our people know it," Norris said.

Although the cities had about two years to consider the shared concept before joining, it took about a year-and-a-half to line up 10 towns before development started. Membership is on a year-to-year basis.

A grant from the Carnegie Corp., which underwrote the cost of an in-depth feasibility study, conceptual designs and projected operating costs, was significant in getting the project started, Norris said.

The cities saw that "at least a portion was going to be paid by someone else," he noted.

But the benefits from a shared system can outweigh the extra effort involved in negotiating with political factors and handling social problems.

Top programmers are attracted by the complexities involved in designing a shared system, Norris said, and "in many ways we're clearly pushing the state of the art." The MDS environment removes the talented DP types from bureaucratic machinations of city functions, and vice versa, he stated.

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"The center can use high volume, ongoing production-type jobs to pay the overhead, thus permitting the programmers to develop what I think is one of the true information system capabilities of using the data. That's the type of thing the cities can never do on their own," Norris explained.

Grants from various agencies are currently underwriting a portion of the development work. "We do pretty well, as we're quite unique," he said, adding that almost all grants are pushing the concept of shared use of data and multiple agency development, which is "right down our alley."

"Our systems are clearly cost effective when compared with in-house or even service bureau operation. We can beat most of the service bureaus because we're specialists. Our guys are all specifically trained to deal with municipal problems."

But it is on our part to teach each municipality paying for the functions it uses, e.g. water billing, according to the number of accounts or population.

The software is highly parameterized, all designed specifically with multiple organizations in mind. The systems can handle monthly, semi-monthly, weekly and bi-weekly payroll, although the tax tables are different for each, Norris noted. The system can serve "any typical city with very minor changes. We think it's a transferable system," he added.

The system is modular, so retrieval is possible from multiple files, and data can be pulled into one working base.

Spotlight on Sharing

accounting and payroll techniques in government agencies are almost the same," he noted.

The typical city councilman doesn't know much about computers, Norris said. But Leonard G. Soper, a DP professional, became president of the MDS board, and "proved to be a real bonanza" in pushing

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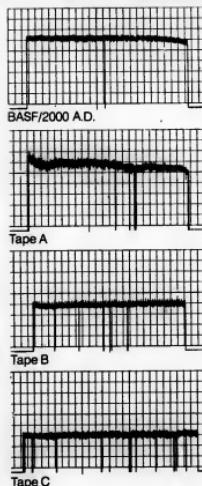
Earlier this year, we picked twenty-five 3200 fci premium tapes at random and tested them for output.

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Computer Products



Editorial

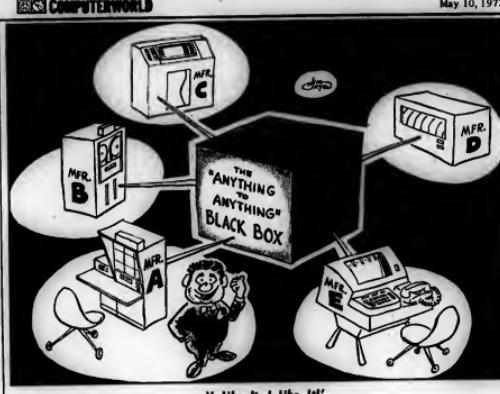
Apples and Oranges

The Federal Trade Commission has cited three of the major chains of private computer schools for allegedly deceptive advertising. Other schools may be cited in the near future, according to the FTC.

It is important for Computerworld readers, as prospective employers of graduates of these schools, to remember that the quality of the training is not in question in connection with the FTC action.

The distinction is important because the value of these schools has been questioned by various DPs and, the FTC action might seem to lend weight to their argument. It does not, because the FTC is only concerned with the way these schools attract applicants, not with the way they screen them and train those they accept.

So each school must still be judged on the reputation it has earned.



And the Compiler Still Doesn't Work

Project That Failed Includes Unspent \$200,000

By Miles Benson

Special to Computerworld

This is my favorite computer story.

It involves big money, big hardware, high-level maneuvering and a strong flavor of chicanery.

Because of this, I'll disguise the players. I'll call the user company, a large diversified aerospace concern, Diversico. I'll call the hardware well known for its marketing prowess, Marketronics. The software company, a highly professional group, will be known as Softpro.

The story begins as a particular compiler for a particular language. To ensure the secrecy, I'll call it Plantran.

To begin, a Marketronics 4000 Series computer at Diversico had a sufficiently high workload, and the firm is thinking about ordering another machine.

Diversico's Problem

Over at Diversico Aerospace, though, there is a problem. The Plantran compiler which came with the 4000 computer works badly. Diversico Aerospace has been working with Marketronics, trying to get the compiler fixed. Diversico has come up with an easy-day programming language, and Marketronics just doesn't seem to care that much.

There is a reason Marketronics doesn't care, the owner says. Softpro supposedly built the compiler under a loosely written contract from Marketronics, and the contract didn't provide for proper finishing touches and maintenance.

When Softpro refused to finish the compiler without more money, Marketronics told Softpro what to do with its request, and in an ensuing contractual pushing and shoving, nothing seemed to move amicably.

Diversico Aerospace management, looking for a crowbar with which to pry Marketronics a little harder, found out about the order for the second 4000 computer. And now the action begins.

Diversico Aerospace talked Diversico management into mak-

ing the second 4000 order contingent on getting an improved version of Plantran. It appears that Diversico and Marketronics rep with that offer.

There were a lot of options open to Marketronics at this point. I'll probably never fully understand what those other options were, but one thing is clear. After a few days of high-level headscratching, the Marketronics rep proposed that if Diversico ordered another 4000, Marketronics would give it the needed fix to Plantran.

Think about that for a minute. If Marketronics really cared about Plantran, really wanted to offer it in its software product set, wouldn't the firm get it fixed up right? Why pay someone to do it? Why not just do it in this way the fixed-up Plantran still wouldn't belong to Markettronics.

The only explanation I've been able to find is that there was no much animosity between Marketronics and Softpro. That Marketronics just didn't want to touch that Plantran compiler again. Maybe there's a better explanation.

Signed for Machines

But Diversico bought the idea, and got a price from Softpro for the Plantran, and signed up for the second 4000, plus promises \$200,000. You can see what kind of shape Plantran was in.

But several months passed before Diversico went to Softpro to sign a contract to fix Plantran.

And the plot thickens. Softpro, its executives say, has broken up the Plantran team in the intervening months. To construct a new team, and do the task will cost more money. Fixing up the compiler is now estimated at \$350,000.

The effect on Diversico was electric. The shock ran through the firm to the top. The price, though, was right, the deadline, too high, and the tactics leave a bad taste. (Maybe that's why Marketronics had refused to go back.)

Meanwhile, that \$200,000 in Diversico's pocket was burning a hole. But it didn't seem to matter much, because there was nothing to spend it on!

And then someone asked, "or is there a Plantran compiler out there?" Some companies in the world, Diversico set out to find one to somehow deliver a Plantran compiler for \$200,000.

The search took awhile. Diversico's computer types spent a lot

of time and money talking to software companies about Plantran. Several companies made bids. Some came on-site to inspect the Softpro compiler or to try bootstrapping a Plantran compiler from another computer. None could do the job for \$200,000.

I'd like to give you a nice ending to this story. But remember, this is a "project which failed."

Marketronics still makes com-

puters. Diversico still uses them. Softpro still builds software. But there is no Plantran compiler on the 4000. Diversico simply never found anyone to do the job for the money it had offered.

But what worries me is that \$200,000. What would happen to Diversico with the aid of a sharp accountant. I'd like to sneak a look at Diversico's books. That \$200,000 is probably still floating around in there, somewhere. But where?

Letters to the Editor

GSA Guides Separate Wheat From Chaff'

The report on General Services Administration standardization of DP titles [CW, April 19] reminds one of the biblical adage that all the wheat is not called, but few are chosen."

The DP title of "computer software specialist/system engineer" and its attendant competency requirements must invariably result in criticism from conscientious software management.

Personal experience and association with a multitude of clients, employees and DMA chapters in the computer industry over the past eight years justify the conclusion that individuals meeting all the qualifications described are conspicuously unavailable.

Other than my former associates at CEIR, I have been in contact with no one who meets the qualifications I suspect those of us within the industry who have designed and programmed one or more complete operating systems/or executives (or who have ever been involved in the development of languages, compilers, assemblers, emulators and sorta) could all be assembled in one large meeting hall.

DP management generally is dissatisfied with operating system (and application) perfor-

mance because of the limited availability of individuals meeting the GSA standards. Overall management responsibility and competency prevail.

The GSA standards for software personnel are necessary, regardless of the "waves" created. They began to "separate the wheat from the chaff."

Robert R. Cromer, CDP
Computer Dimensions, Inc.
Detroit, Mich.

2-Year Grads Eligible

The General Services Administration has excluded two-year technical students from the GSA guidelines and two-year junior colleagues with the standardization of new GSA guidelines.

The junior institutions have produced capable computer programmers. For example, the course work in computer science technology at Texas State Technical Institute requires 62 trimester hours of computer programming plus additional 100 hours for a total of 90 trimester hours. Many courses are heavily structured toward an applications environment.

I feel the GSA should reconsider the requirements for computer programmers and software engineers on the computer side. The criteria should be based upon programming ability.

Ron Carwell
Program Chairman
Computer Science Technology

Texas State Technical Institute
Waco, Texas

of two-year technical schools would be eligible for jobs as coder/programmer. Their education would also be considered as experience, with one year of college equal to nine months of experience, Ed.

A Cause to Pause
Having read Michael F. Smith's "Viewpoint" article [CW, April 5], "User of the IBM's Don't Get Strategic," I paused and then reread it to make sure my eyes hadn't given out on me, and then gasped again. My only possible reaction is one of incredulous amazement at such an attitude. God help Smith's consulting clients.

L.A. Welke

International Computer Programs, Inc.
Indianapolis, Ind.

Computerland Back!

Congratulations on the first issue [CW, April 19] of your new journal, *Computerland*. It is a very welcome replacement for what we have been receiving for some time under the name of *Uterword*.

Roger L. Fisher
Seattle, Wash.
Letters should be addressed to: Editor, Computerworld, 79 Washington St., Newton, Mass. 02160.

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COMPUTERWORLD**Mid-Year Conference****Asis Meeting Focuses on Cost Reduction**

DAYTON, Ohio — Cost Reduction in Information Systems is the theme of the First Mid-Year Regional Conference of the American Society for Information Science (Asis), which will be held here May 19-21.

The program of papers and discussion periods

Processing and Reference Facility in Bethesda, Md., will conduct a mini tutorial on "building block analysis of real systems."

The mid-year regional conference is sponsored by the mid-year local chapters. Information is available through Robert McKee Jr., Asis, 1140 Connecticut Ave., N.W., Washington, D.C., 20036.

Societies

will be divided into three areas, input cost reduction, cost reduction in systems, and general cost effectiveness and benefits. Papers range from specific subjects such as computer based photo-composition to general topics such as consumer research and capital investment, noted Frank Slater, technical program chairman.

'Devils Advocates'

Some "devils advocates" paper question the feasibility of reducing costs at the input end of the system, he noted.

Douglas S. Price, deputy director of the Eric

Another Westinghouse breakthrough: The COBOL Programmer's Tool Kit. At a commonsense price.

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Promotion of Software Development: Sig Topic

ATLANTIC CITY — A fact gathering session on how best to foster development of quality applied software will be held at the Hotel New Yorker, May 17 under the auspices of the ACM Special Interest Group on University Computing Centers (SigUcc).

The meeting will also examine questions pertaining to the economics, management and proprietary considerations of distribution of government software.

Invited speakers for the meeting are: Dr. Ed Battista, International Mathematics and Statistical Libraries, Inc.; Lloyd Fondick, University of Colorado; John Rice, Purdue University; Stuart Lynn, Rice University; James Hirschorn, National Bureau of Standards and Dr. Gordon R. Sherman, Office of Computing Activities, National Science Foundation. The meeting will be held at the Dennis Hotel, from 9 to 8 p.m.

Japan Travel Grants Available From Afips

MONTVALE, N.J. — About 25 travel grants awarded the U.S.A./Japan Computer Conference in Tokyo in October will be awarded by the American Federation of Information Processing Societies (Afips), with funds provided by a grant from the National Science Foundation.

Applications must be submitted to Bruce Gilchrist, executive director of Afips, 210 Summit Ave., 07645, by June 1.

Each recipient will be required to prepare a meeting report which will subsequently be compiled into an overall report by Afips.

Codasyl Seminar Examines Cobol Compiler Building

PHILADELPHIA — A symposium on Cobol compiler building techniques will precede the annual meeting of the Conference on Data System Languages (Codasyl) here May 23.

Papers to be presented at Monday's symposium on current topics such as "3200, B3500, B4500 and Compiler Design Techniques" by F. Alan Goodman of Burroughs Corp., and "Compiler Techniques in Block Structured Languages," by LeRoy R. Guck, also of Burroughs.

John J. Franzo, Univac, will speak on "An approach to Reporting Compiler Detected Errors."

Fees for the meeting at the Activity Center, Drexel University, are \$15 for one day or \$25 for both days. For more information contact: W. Ronald Block, 1st Pennsylvania Bank, 3020 Market St., 6th Floor, 19104.

University Offers Tutorial On Interactive Graphics

STANFORD, Calif. — A week long tutorial on interactive computer graphics is being offered by Stanford University June 18-23 for those with programming knowledge.

The course will cover graphics hardware, software and selected applications and attendees will receive hands on experience and individual help, according to Professor David Thompson.

The \$495 fee includes room, board, tuition, materials and computer time. Enrollment deadline is May 15. For further information contact Thompson at Industrial Engineering Department, Stanford University, 94305.

SOFTWARE & SERVICES

Random Notes

'Cobishort' Cobol Processor For DOS/360 Costs \$300

LYONS, III. — Cobishort, a new Cobol precompiler for IBM 360 DOS users, requires 26K bytes of memory in the user's system. It can handle all the features of the full version of the \$300 program: variable-length programmer abbreviations, standard abbreviations for high-volume reserved words, option of using disk or tape as a work drive when direct input to the computer is required, and automatic compilation of all required source control.

Cobishort rewrites all entries and nested IF statements for easier reading. It also can reformat existing programs and execute a program in one pass, according to the firm.

General Information can be reached through P.O. Box 60534.

Automated Total Text Processing Available on Time-sharing Net

ANN ARBOR, Mich. — A total text-processing system is the latest development of The Cyphertronics Corp. Called the Cyphertext Publication System, the new time-shared service provides text entry, editing, sorting and merging, formating and typesetting capabilities.

Users of the service type their copy on a time-sharing terminal, with simple English instructions which specify type faces, line lengths, paragraph styles and other formating information.

Cyphertronics can be reached through P.O. Box 2194, 48106.

Time Sharing Resources Develops Systems for Leasing Companies

GREAT NECK, N.Y. — Time Shiring Resources, Inc. has developed an integrated system of on-line and batch programs for time sharing companies. Applications include: on-line message switching, orders and movements, rate/rate projection analyses, budget planning and evaluation, billing/accounts receivable and financial modeling.

TSR is at 777 Northern Boulevard, 11002.

Many Minis Mimicked

BRAINTREE, Mass. — Users of DEC PDP-8s and -11s, Honeywell H-16s and Linex L-45s can do program development through the Minicomputer Simulation capability now available on the Minicomputer System of International Computer Corp. (ISC).

This service allows users to write, assemble and debug programs before their minis have been delivered or to develop new systems without interrupting existing ones. Over 100 mini-mimics are installed, ISC, with regional offices in New York City, Pittsburgh and Washington, D.C., is headquartered at 60 Brooks Drive, 02184.

Spooling Package Cuts 1130 Plot Times

By Don Levitt

Of the CW Staff

ENCINO, Calif. — Plotting can be done six times faster on an IBM 1130 equipped with a spooling package from Technology Enterprises Inc. than on the same CPU without the software.

Operations involving card or paper tape punching can also be controlled and im-

proved with the TEI package. Printer output, on the other hand, is handled since it takes too much of the 1130's limited resources, the company said.

Output Shifted

Spooling shifts output for slow devices to disk where it awaits the availability of the device without delaying the program

generating the output. TEI's package lets the user operate in on-line or spooling mode under program or external switch control.

Once spooled, the data is controlled by a utility program and plotted, or punched, concurrently with the execution of another application program. When finished, in effect, providing a form of multiprogramming on the 1130, TEI spokesman stressed it is not a generalized MP facility.

The software includes modifications of IBM's Disk Monitor System version 2 (DMS-2) which allows plotting or punching to be initiated temporarily and exit from a mainline program, and continued when execution of the next program begins.

Minimum Configuration

Minimum system configuration for the TEI spooler includes an 1130 CPU, Model 204 with 8K words of memory, a 1442 card read/punch and an 1132 or 1403 printer or console printer. Additional 2310 disk storage drives are not essential, the company said, as the size of the file to store the plotter codes is specified by the user.

The package is available through a minimum six-month lease at \$375/mo or through purchase at \$3,750.

TEI is at 16055 Ventura Blvd., 91316.

Retrievals From Million Records Performed in Less Than 2 sec.

CAMBRIDGE, Mass. — Multilevel retrievals from files of over a million records typically can be performed in under two seconds on an IBM 360/370 with the Model 204 on-line data base management system from Computer Corp. of America (CCA).

Like the earlier Model 104, the 204 supports variable-length and variable-format records. It provides shared file capability, on-line file maintenance and multilingual operations, the company said.

Full Numerical Computation

This version adds, however, the capability of full numerical computation, on-line report generation and multithread processing of requests from remote terminals. These features give the system more flexibility and faster response, a CCA spokesman noted.

Model 204 includes a user language module, a data base system facilities, and an access method package, through which Model 204 files can be used by programs written in conventional high-level languages such as Cobol. Thus this package is both "self-contained" and a "host" to the data manager, according to the Codasyl definitions.

The user language is in English so that non-DP operators can use it. Requests can be handled in "load-and-go" mode from terminals or card readers, or they may be stored in standard programs.

7070/7074 Simulated

MILWAUKEE, Wis. — Users of IBM 7070 or 7074 programs will soon choose between two emulators for the 360 — one developed primarily for the 360 now have another alternative.

The Data Systems Division, A.O. Smith Co., has a 7070/7074 simulator package that operates under OS/360 as an application program. It requires either the 360 or the operating system of the original 7000 series programs, a Smith spokesman said.

The package requires a 140K byte OS region and can be purchased for \$24,500 or leased for \$1,000/mo.

Smith's Data Systems Division is at 8651 North Port Washington Road, 53217.

The access method is based on inverted file structures. Data can be retrieved directly from a file on the basis of multiple keys, without a sequential search of the file, and this makes retrievals "orders of magnitude faster" than otherwise possible, he added.

The system consists of 22 compatible modules which may be combined selectively to fit individual user needs. The basic system requires an OS/360 region of at least 77K bytes of core, which may be in main memory or a core extension. Extension memory can be on 2311 or 2330 disk drives.

Rental of the basic system is \$300/mo. CCA is at 575 Technology Square, 02139.

Module Makes Numbers English

SOUTHFIELD, Mich. — A module that converts numbers into English equivalents, Checksoft from Computer Services Corp. can be used with Cobol, PL/I or Assembler programs under DOS or OS/360.

Developed primarily to make computer-prepared checks tamperproof, the conversion capability avoid misunderstandings about data transmitted over telecommunications lines.

The module accepts either packed or floating-point numbers and converts them into either of three formats. The simplest form states the data as a single amount, recognizing place values but no assumed decimal points. Thus, the field "3149" would be converted to "three-thousand-one-hundred-fourty-nine."

If the user calls for the dollar value option, the amount would be spelled out as dollars and cents, with two decimal digits.

The third choice also assumes two decimal positions but prints the amount as a whole and a fraction expressed in hundredths.

The English values produced by the module can be right or left justified in the "target" area, under control of a user-specified parameter.

A one-byte numeric field is passed to the CALLING program by Checksoft to indicate the action taken by the module.

This field identifies the error condition in those cases when the conversion could not take place. This would be of particular value to the programmer during debugging and testing.

The Checksoft module can be catalogued into the appropriate subroutine CALL library so that it may be linked when referenced in a user program.

The module costs \$33 and can be ordered from 23225 Northwestern Hwyway, 48075.

Test Data Generator Added to Extract II

SAN FRANCISCO — Extract II, a retrieval, reformatting package from Meqa, has been enhanced to provide test data generation. The new feature allows fields to be generated from tables or ranges, the company said.

Self-check digit development, arithmetic capability and logical control over generation, using Boolean connectors, are included.

In-line editing of generated results and recycling and selective regeneration of test files also are possible.

Extract II requires 22K or 26K under DOS or OS, and is available in object form for \$500 from 26 O'Farrell St., 94108.

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Computaid Systems Corp. is offering all 360 users a complete tape library management package for only \$500. The CSC System provides for all edits and reports necessary to successfully manage the tape library. In addition, the system provides a generalized report writer capability. For further information contact:

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Computaid Systems Corp.
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Business Oriented

'Alice' Handles Time-Sharing on Novas

NEWPORT BEACH, Calif. - Data General Nova users with 8K of core, a multiplexer and disk can have a number of business-oriented features by adding the Alice Interactive Computing Environment (Alice) operating system from Educational Data Systems.

Alice is a multi-language, file oriented system that supports time-sharing operations. The system includes an Extended Basic, a time-share and Assembler package, a computer-assisted instruction (CAI) author language, and a general purpose macroprocessor.

A range of system and utility functions provide user accounting reports, file security and debugging of programs while running in a time-share environment. A message system which can be used with mass disks that function with the Nova minis provides random access to files, records and items. It also controls record format and length and the combining of data types within a record, company spokesman said.

The Extended Basic includes extended precision fixed and floating point decimal arithmetic, PRINT USING instruction with Cobol-like format

controls for simplified report generation, string processing, and matrix operations.

The Assembler package provides a disk-to-disk link, a disk-to-disk reader, and a machine language interpreter which combines to permit system software development under time-sharing.

The user accounting capabilities permit the setting of limits and the reporting of CPU time, connect time and file usage, by user-specified account numbers. The security system establishes four privilege levels and allows users to set passwords on any file. File can be read, write, list, copy, move, delete, and update, the company said.

Alice also includes a Fortran-to-Basic translator so that programs developed in the higher level language can be adapted to the level of the Basic user.

Alice is modular; the primary package includes the time-share and CAI author system. Extended Basic adds disk file support. It is available for a one time license fee of \$5,500. The complete system can be acquired for \$9,000. The firm is at 435 Windward Lane, 92660.

Package Watches OS System, Staff Work

MCLEAN, Va. - IBM 360 users who are operating under both DOS and OS can monitor system utilization, measure programmatic activity and system performance to good identification of operations, productivity with the OS/DOS Performance Measurement and Accounting System from Johnson Systems.

The software handles data collected by the Systems Measurement Feature (SMF) of OS, and data from the Job Accounting module for DOS. It also adds data about the Job Scheduling (JES) operations and "toggling" operations including, for example, key punch jobs, programmer changes, and library storage.

With this amount of input available, the user is able to design the reports he wants and the formats they are to follow. The system provides for the sorting of data, up to three key fields, and either ascending or descending sequence.

The reports are structured through control card entries and as many as seven reports, each with independent design specifications, may be generated in one job step, Johnson claimed.

The cards for each report are catalogued to disk from which they can be retrieved with a single command.

In addition to displaying Job Accounting statistics for DOS use, and SMF data elements for OS operations, the system can display more than 25 computed elements at the job and job step level. The reports may be sorted by level, with breaks and totals identified by user-specified alphanumeric descriptive labels.

The price of the OS/DOS measurement system is \$2,450. A simpler DOS-only version is also available for \$1,450.

The firm is in the Grant Building, Westgate Research Park, 22101.

Ancom Eases Cobol

SAN DIEGO, Calif. - Ancom Systems has made available its Cobol Documentation System designed to ease the programming work of preparing and maintaining code.

It expands short user-chosen data names into fully descriptive names, and replaces all existing procedure paragraph names with sequentially numbered ones, when used as a source preparation processor.

The sequential numbering of paragraphs and the standardization of margins and indentations to indicate logical relationships within the program provide documentation better than most programmers are willing to do, Ancom asserted.

The system requires 450K of core and three tape or disk peripherals. It is priced at \$50/mo and can be ordered from 1250 Sixth Ave., 92101.

SYSTEMS & PERIPHERALS

Bits & Pieces

TM-34 Drives Are Low Price Subs for 3420s, 2420s

MARINA DEL REY, Calif. — The TM-34 tape drives and TC-38 controllers from Amplex are intended to provide a low-cost substitute for IBM 3420, 2420 and 2401 tape drives on systems 360 and 370.

The Amplex devices offer automatic threading and single capstan drives and can run up to 1200 in./sec. (IBM's Amplex). The Amplex drives have speeds ranging from 75 to 180K in./sec. and data transfer rates to 180K. Packing densities of 200, 556, 800 and 1,600 bits/in. are offered.

Prices for a system consisting of two TC-345 controllers and two TC-38 controllers are \$1,360/mo on a two-year contract or \$68,000 purchased. This compares with a price of \$1,507/mo for two IBM 3420V drives and a 3803 controller with a similar lease. First deliveries will be made this summer.

Memorex 3670 OK'd for 360/65

SANTA CLARA, Calif. — A major reason for the failure of the 360 user switch to 370s has been eliminated by Memorex Corp. The company's 2860 selector channel attachment allows the Memorex 3330-equivalent, the 3670, to be used with any 360/65 and above as well as with any 370.

Memorex also announced an enhanced version of the 2860 controller attachment which allows up to four 360 and/or 370s to be used with a single 3330 system.

The 2860 costs \$250/mo. First deliveries are scheduled for the second quarter of 1973.

Smaller Bits

A regional computer service facility has been established in Dallas by Computer Hardware Components and Services Inc. The plant will serve the Southwest in providing such services as customized system configurations, installation and removal of systems, troubleshooting, repairing and reconditioning, upgrading components with model and feature changes, and furnishing mixed systems staging, the company said.

The Model 276 Computer/Calculator Feedback Controller from Princeton Applied Research Corp. permits a calculator or computer to control an instrumented system. It costs \$1,950.

Cycle Tape Equipment Co., Los Gatos, Calif., has designed a system for handling punched paper tape with tape readers of either block or strip type at over 100 in./sec.

By Frank Plaia
Of the CW Staff

ZURICH, Switzerland — The problem of making printed matter equally acceptable to man and machine may have a step closer to solution with the publication of the latest revision of the OCR-B font by the European Computer Manufacturers Association (Ecmi).

Although it has been used in Europe since first recommended in 1969, the OCR-B font has found little favor in the U.S. where OCR-A is the accepted standard.

The latest OCR-B resulted from efforts by a joint task force from Ecmi

1234567890

ABCDEFGHIJK

LJKLMNOPQRSTUVWXYZ

abcdefghijklmn

opqrstuvwxyz

*+-=/.,-,:;"-

?(!)<>[]%#&%^

Parts of Latest OCR-B Character Set and Arial, and is known as Standard Ecmi-11 second edition.

Copies of the second edition of Stan-

dard Ecmi-11 are free from the association. It also provides a copy of the original drawings on a set of grids. Duplicates of the original drawings on a stable base of 100:1 scale with the 280mm by 380mm grid can be obtained.

The following sets of drawings are available: letterpress font, size I; letterpress font, size I, with the grid removed, over approximately 2mm around the character outline (suitable for photocomposition); constant-stroke-width font, size I; and constant-stroke-width font, size I. Requests should be sent to the Secretary General, Ecmi, at 114 Rue du Rhone, CH-1204.

IBM Adds OCR Unit for 370

WHITE PLAINS, N.Y. — IBM has introduced an optical character reader that can read printed numbers either on-line into a System 370 system or off-line onto a magnetic tape.

The IBM 3881 can handle document sizes ranging from 3 in. by 3 in. to 9 in. by 12 in. All of the documents in one batch, however, must be of the same size, IBM said.

The reader is designed to operate with the System 370 models 135 or 145 as an on-line reader. It can also be configured to be used off-line with the data being written to an IBM 3410 magnetic tape unit for later processing.



!CW Photo by F.J. Pustel
Data General's designer Max Scholz talks about his Novadisc.

The versatility of the device is enhanced by its ability to read up to six different forms of data within the same batch. This means that up to six different forms can be intermixed within one batch without presorting, provided they are all the same size.

An optional capability to read binary and decimal (BCD) data may add additional versatility to the 3881 and could allow reading of both preprinted BCD document identifiers as well as pencil-marked OCR information on a single pass through the machine. This could be especially useful in such applications as processing cards marked by utility meter readers, IBM pointed out.



'IBM Mark Reader'

Short-term lease rates on the 3881 begin at \$1,234 for the basic unit, which will sell for \$51,000. First shipments will take place during the first quarter of 1973, IBM said.

Novadisc Claimed Crash Resistant

SOUTHBORO, Mass. — Data General has unveiled its first removable disk drive, intended for the company's Nova family of minicomputers.

Announced shortly after a similar device was shown by Digital Equipment Corp., the Data General disk is said to provide significant savings in disk storage at a lower cost than the DEC drive.

The Novadisc is a fixed-head drive in capacities of 128K, 256K, 512K and 768K 16-bit words. A standard 2311-type disk pack is used.

Air-Bearing

The unit features an unusual air-bearing that supports the head away from the disk surface. Exerting a force of 2 lbs and capable of tolerating a force of up to 4 lbs, the bearing design is said to prevent heads from even high-shock industrial applications.

Damage to the disk surface and heads is prevented with an automatic system that retracts the heads in case of power failure

or disk speed variation of over 10% from the normal 3,600 rpm.

The use of retractable heads in connection with the 2311-type packs may mean the drive could be used as a removable pack. The company would only admit the pack could be changed "in a couple of minutes," but maintained the unit was intended strictly as a fixed disk device.

3-Frequency Recording

The Novadisc makes use of three-frequency recording which, Data General claims, reduces the number of head reversals required to enter data on the Novadisc. The new units have an average latency time of 8.4 msec and a data transfer rate of 2 million bit/sec.

The 256K Novadisc with a fixed control unit costs \$9,750. The prices of the other Novadisc models, including the 32,000 controller, are: 128K, \$8,200; 512K, \$12,500; 758K, \$15,560. Units can be upgraded in the field by adding head assemblies, the company said.

First shipments are scheduled for July.

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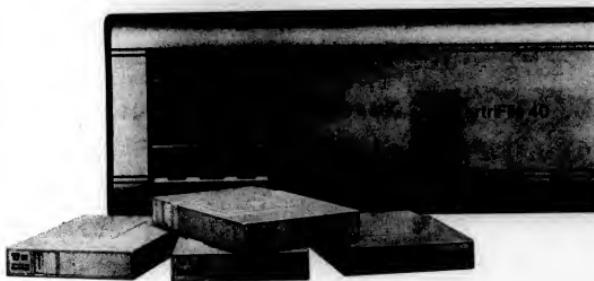
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DCC's Fastest 12-bit Minicomputer Offers Choice of Memory Technologies

FAIRFIELD, N.J. — Claimed to be the most powerful 12-bit minicomputer available, the D-112H/SC from Digital Computer Controls, Inc. (DCC) can perform overlapped microinstructions using its semiconductor RAM (random access memory) up to 200K words.

The D-112H/SC offers the user his choice of either semiconductor or a 1 μsec core memory. In order to accommodate the variance in speed, the mini is equipped with special look-ahead circuits that adjust the internal timing to match that of the memory to be accessed in the next instruction.

The D-112H/SC has compatibility with the DEC PDP-4, enhanced by faster speed, according to the firm. Other advantages cited for the D-112H/SC are an expanded instruction set and three times as many auto-index registers.

Core memory is available in 4K increments up to 32K words. The semiconductor memory is available in 256 word segments. Each 1K of semiconductor memory replaces 4K of core memory, limiting the total capacity of an all-semiconductor machine to 8K words.

An optional external micro I/O transfer provides

D-112H/SC Mini program control IOP generator and all the interface signals for the I/O and data break transfers, and an optional I/O transfer data bus can be provided between the processor and any peripheral.

This bus is shared by memory and the peripheral, permitting transfer of data directly to or from memory.

The D-112H/SC with 4K of core memory, 1K of semiconductor RAM, and a TTY interface costs \$9,400. Delivery is 45 days from 12 Industrial R.D., Fairfield, N.J. 07006.

Basic Input 80 OCR Meant for Small User

IRVING, Tex. — Recognition Equipment Inc. has announced a basic version of its Input 80 optical character recognition (OCR) system.

The system incorporates advanced optical reading technology in a lower-priced configuration designed for medium- and smaller-volume computer users, the company said.

Throughput and reading performance are similar to that of the standard Input 80.

System configuration includes a lower-cost programmed controller and peripheral subsystem. The data capture software provided offers the necessary editing functions and reduces user programming requirements for complex applications.

In a single-foot module, the system leases for \$10,760/mo and sells for \$358,000. Basic multiple-font configuration has a monthly lease price of \$12,545 and sells for \$433,000. Basic multifont configuration leases for \$15,225 a month and sells for \$530,000. Delivery is eight months from Carpenter Freeway at Grawyler Rd.

Sycor Adds Line Printer To Intelligent Terminal

ANN ARBOR, Mich. — A 200 line/min printer to be interfaced directly to its 340 intelligent Terminal has been announced by Sycor Inc.

The 3485 printer is useful to remotely located Sycor intelligent terminal users who have high print volume applications, and who also require the ability to document their same day use, Sycor said.

The contents of two cassette tapes, 400K char, located on the 340 terminals, can be printed in less than 20 min on pin fed form up to 18 in. wide.

The 3485 is a character printer, and the built-in carriage shifting system, stepping switches for paper advancement, and individual motors for ribbon drive are said to make the 3485 exceptionally reliable.

Yearly leases of the 3485 are available for \$395 per month including maintenance, and delivery is 60 days from 100 Phoenix Drive, 48014.

Standards Institute Offers

Punched Paper Tape Guidelines

NEW YORK — Standards for punched paper tape have been published by the American National Standards Institute (ansi). The standards, known as ansi X3.34-1972, cover dimensions for interchange rolls, tape length, directional markers on tape and length of header and trailer, and are intended to guide in equipment design. Copies of the standards may be ordered for \$3 from ansi at 1430 Broadway, 10018.

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Another example is ROSCOE which permits

METACOBOL

programmers to develop and execute programs conversationally on-line to the computer, avoiding the interminable waiting of normal batch operations and the sagging morale that results from it.

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Data General, the world's number 2 minicomputer company, has just introduced a new line of compact, fixed-head discs — the Novadiscs.

They're the ruggedest, most reliable mini discs on the market.

When we designed the Novadiscs, we recognized that a critical consideration was reliability: most mini-computer discs simply can't stand up to the kind of hard use that mini-computer mainframes take.

So we made sure the Novadiscs have the guts to go anywhere our computers go — including the tough on-line industrial applications in which modern minicomputers work.

Instead of trying to fly the read-write heads on a fragile 30- or 40-gram air bearing, we designed an air bearing that can stand up to 4 pounds of force. So the heads aren't disturbed by the

A NEW DISC WITH GUTS.

bumps and jolts that make other discs crash.

When they're not flying, the heads are secured, outside the disc pack cylinder. So you don't risk a crash every time you move the unit across the room — or across the country.

The Novadisc recording medium is an industry-standard, 10-surface disc pack. The motor, drive spindle, drive belts, and air filters are the same ones used on big, mass-produced disc drives. Some of those parts are over-engineered for our requirements. They're also a lot less expensive and more reliable than anything else on the market.

The Novadiscs have all the other right specs, too.

Price. A Novadisc with storage capacity of 128K 16-bit words costs

\$5,200, 256K is \$6,750, 512K is \$9,250, and the 768K Novadisc costs \$12,560. Quantity discounts are available.

Size. Including power supply, the Novadiscs are only 12½ inches high.

Speed. Average latency time is 8.4 milliseconds, and data transfer rate is 2 million bits per second.

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Software. Novadiscs are compatible with our device-independent Disc Operating System, which handles

user I/O and provides interrupt-driven buffered service for peripherals. DOS supports a relocatable assembler, editor, linking loader, Extended ALGOL, Extended FORTRAN, and Extended Timesharing BASIC.

Peripherals. You can add mag tape, other DOS-compatible discs, A/D and D/A, communications equipment, CRT's, plotters, printers, card readers, paper tape equipment.

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DATA GENERAL

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COMMUNICATIONS

Data Briefs

Chicago Users Organize Teleprocessing Group

CHICAGO — A regional communications organization, the Teleprocessing Users Group (TUG), has been formed by 10 firms in the Chicago area.

The group, recently formed, its first meeting was conducted monthly, meetings will deal primarily with networks; controllers and software; terminals; end modems and multiplexers/concentrators.

TUG will hold monthly workshops meetings covering one of the specific interests of each spokesman said. The organization will be limited strictly to computer/communications users, with a membership of \$100/year for each firm. Further information is available from Nick Ferry, Spiegel Inc., 1040 West 36th St.

Sanders Has 2,400 bit/sec Modem
NASHUA, N.H. — Sanders Associates Inc. has announced the Series 240 modem for operation at 2,400 bit/sec on "most unconditioned" leased lines and dial-up facilities.

The 240 is said to operate with digitally implemented phase-shift keying modulation at either 1,200 or 2,400 bit/sec.

The modem is available on a 60-day delivery schedule for \$1,700. The firm is at Daniel Webster Highway South, 03060.

GE Modem Features Diagnostics
LYNCHBURG, Va. — GE has added a 2,400 bit/sec date set to its DigiNet series. The 2201 is compatible with the Bell 201B and includes internal diagnostics and a switch-selectable line equalizer.

The 2201 has a test signal generator, error counter, local and remote loop-back capability. Using the built-in line equalizer, the 2201 can overcome distortion. Type 2002 lines or dial-up facilities with access arrangements is possible, GE said.

First deliveries of the 2201 are scheduled for June. The data set costs \$1,450 with ten-line plans. GE Communications System Division can be reached through Box 4197, 24502.

Rixon Develops Fast Turnaround
OVER SPRING, Md. — Rixon Electronics has announced the DS-1800C date modem for multipoint polling. The unit features a turnaround time of 4 to 8 msec compared with a comparable Bell data set turnaround time of 10 msec, company said.

The DS-1800C is compatible with the Bell 202 data set series and costs \$500. Rixon is at 2120 Industrial Parkway, 20904.

Couplers Called Arbitrary

Non-DAA Interconnection Predicted

By Ronald A. Frank
Contributing editor

NEW YORK — It is only a matter of time until data users are allowed "free interconnection" to the Bell System and the data access arrangements are declared unconstitutional, according to Sam Y. Whang, technical director of International Telephone & Telegraph Corp.

The interconnection issue is similar to integration, Whang said, and he predicted that in five to 10 years users will be able to eliminate modems. The current DAA requirements are arbitrary, he said, and users should not allow this type of "formalistic regulation."

Speaking to about 100 data users at the spring regional seminar of the Communications Systems Management Association (CSMA), Whang said, "We can't lock up all users because of potential harm to the phone network."

Financial Analyst's Advice

When selecting independent communications equipment, the user should consult with a financial analyst to properly evaluate the effects of lease versus purchase options, according to Robert Kraynak, director of Xerox Corp.

While certain risks are included with the selection of non-carrier equipment, the user can protect himself with a strong contract, Kraynak said. Such an agreement should include minimum maintenance support, prompt delivery, the independence of supplier, and ideally, it should include a provision to install alternative equipment when technically superior devices become available, he suggested.

Louis Feldner, FCC staff specialist on interconnection, described the efforts under way to develop new interconnection methods. The PBX study committee

has submitted several draft recommendations, none of which are final, Feldner said. After the technical and procedures subcommittees complete their recommendations on an interconnection method, the FCC will schedule formal hearings to be held before a joint board including both state and federal regulatory officials.

FCC Must Decide

Any findings or recommendations of this board will then be subject to final action by the FCC, the staff specialist said. Despite the many remaining problems, the FCC has established an interconnection study committee on PBXs and dialing/answering devices had worked "ferociously" to solve the complicated issues.

Three possible solutions to the interconnection of PBXs and other equipment include certification, type pre-approval and type approval, Feldner said. The approval method would give the FCC stronger control over interconnection equipment than the acceptance method, he said. A certification plan would involve an impartial organization to test equipment, according to the FCC.

Speaking for AT&T, Lawrence A. Hohmann, engineering manager for regulatory studies, said Bell's interconnection policies are designed to be privately beneficial without being publicly harmful. He said, "The carrier user is usually willing to accept non-carrier equipment," he said, since AT&T wants assurance that such equipment is properly installed and maintained by a common carrier.

Protection of phone facilities is not really a new concept, Hohmann said, and he repeated Bell's claim that protective

measures should also be added to private lines as well as the (already required) DAs for dial-up lines.

Feldner told users the FCC is anxious to hear their views on pending regulatory issues. Since relatively few users have been included on the interconnection study groups, the commission does want to receive continuing inputs, Feldner said.

Line Problems Defined

NEW YORK — Phase jitter and T-carrier distortion are the two major types of line problems affecting AT&T's data users, according to Sam Y. Whang, technical director of International Communications Corp. (ICC).

High-speed modems must include technical features to overcome the technical line problems, Whang said. Modem data users are operating at slower-than-standard speeds because of poor line quality, he said.

Phase jitter on data lines was first encountered when Bell began to replace tube-type equipment with solid-state devices, Whang said, and phase distortion originated with the advent of time-division multiplexing techniques.

Close cooperation between AT&T, ICC and others brought forth a test device to identify and measure phase jitter, Whang noted. Previously, Bell had no way to measure this characteristic, he said.

To solve the T-carrier distortion problem, AT&T is working with equipment vendors to define minimum number of bits levels where they know good. One current problem is that AT&T says that 24dB distortion is tolerable, while independent experts say that this level is too high to be acceptable with high-speed data sets, he added.

Both problems are most harmful to data users instead of voice customers, according to Whang. And since the Bell System is designed primarily for voice, it may be difficult to find acceptable solutions, he said.

For the problems are most harmful to data users instead of voice customers, according to Whang. And since the Bell System is designed primarily for voice, it may be difficult to find acceptable solutions, he said.

He asked users to be specific when they call or write to the FCC staff.

"We have heard all the big-picture phrases," Feldner said, adding that the commission is looking for detailed information.

Robert Liepold, president of United Business Communications, predicted that in-depth controversies will arise when the carriers and independent suppliers test their rates to compete with the new specialized carriers. But both the carriers and independent suppliers will have to be more receptive to the user's requirements, Liepold said.

ADS Adds 1,200-3,600 bit/sec Modem, Multiplexer, Tester

CANOGA PARK, Calif. — American Data Systems has added a medium-speed modem, a time-division multiplexer and a data terminal converter to its line of communications products.

The ADS-41/424/436 modem can operate at 1,200 bit/sec using frequency-shift keyed synchronous transmissions or it can operate at 2,400 and 3,600 bit/sec with phase-shift synchronous mode.

The modem operates at half- or full-duplex phone facilities, and is compatible with Bell 201 data sets. With optional 2,400 bit/sec circuit module, the ADS modem is compatible with Bell 201 data sets and costs \$580.

The ADS-101 Data Distribution System can input seven modulated rates in varied line configurations.

The multiplexer can handle up to 128 channels. A typical 16-channel system costs about \$6,000, a spokesman said.

The ADS-111 Data System Simulator can test a variety of data systems over telephone lines. The unit generates a binary sequence of characters to check the operation of modems, multiplexers, interface terminals, automatic call devices and other equipment. The 111 can operate in four test modes and displays errors on the front panel.

The ADS-111 costs \$2,500. All three data devices are available in about 25 days from the company at 8851 Mason Ave., 91306.

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IBM Mobile Terminal Permits Police To Access Computer Files Directly

WHITE PLAINS, N.Y. — A mobile terminal from IBM will allow a policeman in a patrol car to access and update files stored in a 360 or 370 computer system. The IBM 2976 mobile terminal allows the police officer to query the computer through a typewriter-like keyboard. The system can respond to the inquiry or can initiate messages which are relayed to the policeman via a speaker, eight signal lights or a strip printer.

Ten keys can be designated to

relay special messages from the squad car to headquarters.

A buffer memory is included in the terminal so that messages can be sent or received at faster than keying or printing rates. The printer produces a 21-char. line at 53 char/sec.

The system includes a transmission control unit that can automatically transmit at intervals. Heavy activity in a particular area can cause the control unit to automatically adjust its polling to minimize interference

among the busy terminals.

The system can operate with most 360s and all 370s equipped with the optional disk drives. A system for 300 squad cars will cost about \$1,270,000. First shipments are scheduled for the third quarter of 1973.



Policeman checks printout on IBM 2976 terminal.

Kit Lets 1004 Use Bisynch

DALLAS — University Computing Co. is offering users a logic conversion kit that permits a Univac 1004 to transmit data in the IBM 2780-compatible synchronous format.

The UCC 1004 conversion kit is housed in a low-profile cabinet and does not conflict with other 1004 operations, according to UCC.

The 1004 kit was developed primarily for 1004 users who have purchased the equipment and could benefit from the speed/format advantages of the 1004/2780 combination in remote terminal operations.

IBM 360 systems, UCC said. Purchase price for the 1204 kit is \$12,800 with delivery to begin in August of 1972 from 1500 UCC Tower, 75222.

Terminal Optically Reads Cards, Checks Credit, Imprints Ticket

EL SEGUNDO, Calif. — A terminal that optically reads credit cards embossed with an IBM 7B font, automatically verifies the card, imprints the sales ticket has been developed by Data Source Corp.

The DSC 2101 was designed for use in gas stations and high volume retail outlets. As many as 100 cards can be read simultaneously to a DSC 800 mini-based controller over a single 300 bit/sec leased line. The controller can

handle up to 64 lines and is hardware and software compatible with the IBM 360.

To verify credit, the card is inserted into a terminal and the dollar amount of the transaction is entered. Within five to 10 seconds, a visual response from the credit center, computer either authorizes the credit or rejects it. The imprint can be performed by the operator.

If credit had been authorized, the sales ticket is inserted and imprinted. In case of system failure, the imprinter can be operated manually.

The terminal is priced at under \$1,000 and will lease for \$25 to \$30/mo. First deliveries are scheduled for the third quarter, 1972.

The DSC 800 controller sells for about \$18,000/ea.; modems are priced at about \$10/mo. Software is included. Data Source Corp. is at 2350 Alaska Ave., 90245.



DSC 2101

modems

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Model 301P—Acoustic coupler kit for Series 33 Teletype installation. **\$245**

Model 302D—replacement for 103A. Provides compatibility with 1001B, CBS DAA, TTY motor starter, initiate & respond to long space disconnect end 10 minute activity. **\$325**

Model 302F—replacement for 103F, Provides compatibility with 1000A, COT DAA applications. **\$245**

Model 310—PC modem for OEM. Original acoustic/DAA, carrier detect, integrated power supply. $4\frac{1}{2} \times 5\frac{1}{2} \times 3\frac{3}{4}$. **\$125**

Model 320—PC modem for OEM. Answer/originate/DAA, carrier detect, integrated power supply. $4\frac{1}{2} \times 5\frac{1}{2} \times 3\frac{3}{4}$. **\$165**



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SJCC Makes 'Every Effort' for User Needs

By Edward J. Bridgeman
Of the CW Staff

ATLANTIC CITY, N.J. — Innovations in the technical program, registration format and in business matters with exhibitors mark the attempts of the Joint Computer Conference to accommodate to keep the JCC's responsive.

Pages 21-22 are devoted to advance coverage of the products and services on display at next week's Spring Joint Computer Conference.

see to user and industry needs. At next week's spring conference held for the first time, an effort is being made to make the exhibit program "as accessible as possible" to DP specialists and users, stated Keith Neuner, Afips president. A new one-day, non-member-only registration is available at \$5, he said; there is also a one-day fee for both the technical program and the exhibits, for \$15.

These new registration fees have been initiated in order to attract conference-goers to Atlantic City for the first time; next year the spring conference moves to Philadelphia. The Fall Joint Computer Conference has already cancelled its Las Vegas date, in favor of an early December meeting in Anaheim, Calif. While there will be few prod-

SJCC Fee Structure

With advanced registration complete, the following fees are applicable for the SJCC:

- Total conference for members of Afips societies, **\$30
- Total conference, non-members, **\$45
- Students: military in uniform, \$5
- One-day, including sessions, \$15
- One day, exhibits only, \$5
- Three days, exhibits only, \$10
- Luncheon, \$8
- Conference reception, \$9

**Includes one copy of Proceedings

ucts introduced to end users, about a third of the exhibiting companies will be displaying relatively-new peripherals and accessories for the first time. The emphasis in the exhibit hall appears to be on communications and terminal equipment, and most of that for the OEM market.

While the various JCC committees have attempted to reorient the technical program for the end user, the chairmen of the technical sessions are almost entirely university or industry types, much continuing tradition over the last several years.

There are 37 sessions, plus several new ideas that formulate the technical program. One-third of these sessions is devoted to programming and software, with the remaining two-thirds to scientific applications, hardware, education and theory, administrative issues, and the two special evening panel sessions.

The Wednesday evening sessions, both at 8:30 p.m., are "Contracting for Computer Systems" (a workshop), and the role and scope of computer systems design research in a university setting.

A late addition to the technical program is a user workshop on "Contracting for Computer Users."

The workshop is open to all SJCC attendees, including those who choose to register for one-day exhibits-only.

The workshop will take the form of a series of presentations conducted by Roy N. Freed, a Boston attorney who specializes in contracting for computer use.

The session "will provide first-hand answers and practical advice" to anyone concerned with the purchase, sale or conversion of EDP systems, Afips said. "It has been structured to be of immediate assistance to users and to EDP producers and suppliers," an official said.

The keynote address at 9 Tuesday evening will be given by T. Vincent Learson, chairman of the board and chief executive officer of IBM.

Advanced registrations were being received at the rate of about 100 a day, and the period

was extended until late last week, Afips said. It was expected that about 2,000 advance registrants would be recorded, which would not represent a dramatic change from normal.

Societies Rival Technical Program

ATLANTIC CITY — While the technical program at this year's SJCC is one of the most comprehensive ever, the same can also be said of the senior DP societies, the Association for Computer Machinery and the Institute of Electrical and Electronics Engineers Computer Society.

Both of these groups will be holding meetings, some open to the public, regarding progress in technical subjects. They will also hold special board meetings, which are not listed here.

All meetings of the ACM will be held in the Dennis Hotel; the IEEE Computer Society will hold its meetings at the Holiday Inn.

Association for Computing Machinery

Tuesday, May 15

1 - 6 p.m. Curriculum Committee on Computer Science.

8 - 10 p.m. Computer Resource Accounting (sponsored by Special Interest Group (SIG) for Computer Systems Installation Management).

Tuesday, May 16

9:30 a.m. Curriculum Recommendations for Graduate Professional Programs in Information Systems (sponsored by Curriculum Committee on Computer Education for Management).

2 - 5 p.m. ACM Standards Committee; Professional Standards and Practice Committee.

5 - 6 p.m. External Activities Board.

7:30 - 10:30 p.m. Panel meeting on a program to develop a computer that "understands" speech (sponsored by SIG Artificial Intelligence).

8 - 10 p.m. Open business meeting to discuss future directions of SIG/Computer Science Education.

8 - 10 p.m. Informal meeting of active users of computers in teaching; emphasis on work in progress (sponsored by SIG/Computer Usage in Education).

8:30 - 10:30 p.m. Software Considerations in Design and Data Processing System: Business/Technical meeting of SIG/Communications. Plans will also be outlined for 1972 International Conference on Computer Communications.

Wednesday, May 17

7:30 - 9 a.m. Audit Controls for On-Line Processing (business/technical meeting sponsored by SIG/Business Data Processing).

8:30 - 10 p.m. Business/Technical meeting of SIG/Simulation, sponsored by SIG/Simulation.

5 - 8 p.m. Panel meeting on improving the quality of software for researchers, sponsored by SIG/University Computing Centers.

6 - 7:30 p.m. Meeting of SIG/File Description and Translation.

6 - 8 p.m. Computer Graphics in Design Auto-

mation; joint technical meeting sponsored by two SIGs, Graphics and Design Automation.

6 - 8 p.m. Data Structures in Information Retrieval, sponsored by SIG/Information Retrieval.

7 - 9 p.m. Business/Technical meeting on Surviving as Social Science Computing Specialists in the Job Market (sponsored by SIG/Social Science Computing).

7:30 a.m. - 12 p.m. Seminar on the Environment, sponsored by the subcommittee on the environment, SIG/Computers and Society.

8 - 11 p.m. Computers and the Physically Handicapped.

8 - 11 p.m. Background and Technical aspects of PL/I Standardization, sponsored by SIG/Programming Languages.

8 - 11 p.m. SIG/Numerical Analysis.

Thursday, May 18

9 a.m. - 12 p.m. Professional Standards Committee.

Friday, May 19

9 a.m. - 5 p.m. ACM Council.

9 a.m. - 5 p.m. Joint meeting, SIG/Physically Handicapped and Visually Impaired Data Processors International.

IEEE Computer Society

Tuesday, May 16

1 - 4 p.m. Operating Systems.

7 - 12 p.m. Data Access and Control.

Wednesday, May 17

9 a.m. - 1 p.m. Peripheral Equipment.

9 a.m. - 12 p.m. Computer Elements.

9:30 a.m. - 12:30 p.m. Computer Communications.

1 - 5 p.m. Education.

1 - 5 p.m. Pattern Recognition.

3:30 - 6 p.m. Communications Standards Subcommittee.

Thursday, May 18

10 a.m. - 3 p.m. New Activities.

12 - 6 p.m. Socio-Economics.

Friday, May 19

9 a.m. - 5 p.m. Governing Board.

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Inforex 1302 Triples 1301 Disk Capacity

ATLANTIC CITY — Inforex will show its System 1302, a more powerful version of the 1301 key-to-disk data-entry system introduced by the company over two years ago.

Inforex will also exhibit in SICC booth 1310 retransmitter and the optional timer feature for the first time as well as the company's recently announced on-line communications capability.

The 1302 system offers more than three times the disk capacity of the 1301 and supports from one to 16 keystations. Rental cost is \$100 per keystation or \$10/mo./keystation/mo. with maintenance.

The on-line communications feature permits users of Inforex data entry systems to send and receive tapes directly to and from IBM computers via IBM 2701 or 2780-type Transputer Control Units or via the BiSync Adapter for users of the IBM Model 360/20.

Cost of the on-line communications feature is \$100/mo./system, including maintenance, or \$2,800 for outright purchase.



Graf/Pen, Tape System

SAC Has Graf/Pen, Tape Systems

ATLANTIC CITY — The Science Accessories Corp. exhibit at booth 432 will feature two new off-line systems for the conversion and storage of digital information from graphic displays.

Both systems are based on the use of SAC's Graf/Pen sonic digitizer to generate digital coordinates from graphic representations.

Systems 2021 and 2022 utilize magnetic tape as the storage medium. System 2021 uses 7-track tape; System 2022, 9-track.

ATLANTIC CITY — Paradyne Corp. will feature continuous on-line demonstrations of one of its high-speed, dial-up data communications systems — the Paradyne BiSync-48 at booth 2214. The modem will be connected to a 2780-type terminal.

Three additional modems/error-control systems will be exhibited. The M-48 is a

4,800 bit/sec modem that offers optimum performance on 4-wire unconditioned leased or dial-up lines. The Pix-600 is a 600 byte/sec parallel interface extender which incorporates a 4,800 bit/sec error-free channel and a 16-channel serial port; and the Marq-48 is an error-control modem which provides a 4,800 bit/sec error-free throughput on most dial-up or unconditioned private lines.



Model Modem

Sangamo will be displaying new second-generation data sets at booth 2322, including the Model 3600 operating at 2,400 bits/sec via either unconditioned lines of the DDD network or the T4800 operating at 4,800 bit/sec via the DDD network.

Series 30 Teleprinter Prints at 30 char./sec

ATLANTIC CITY — The Series 30 Teleprinter, a single-unit printer/teleprinter designed to operate synchronously at 30 char./sec., will be demonstrated at booth 1709 by International Teleprinter Corp.

An original and five carbons can be produced with clarity and sharpness.

Series 30 Teleprinters operate half or full duplex and use front or spine paper feed, and can handle paper. Optional features include the following interfaces: parallel TTL; Serial TTL; Serial Current Loop; and Serial EIA RS 232-C.

OEM prices are: RO Teleprinter \$1,100; KSR, \$1,400; ASR Teleprinter, \$2,000. All come complete with console and all necessary electronics. First shipments will begin in July for RO and KSR Teleprinters and in November for ASR Teleprinters.

PGI Disk System Uses Universal Controller

ATLANTIC CITY — Peripherals General Inc. will exhibit its model 844 Disk Storage System for the first time at booth 408.

The disk system, which uses PGI's Universal Controller, is intended as a replacement for the IBM 2314 at lower cost. The controller can be programmed to adapt to any manufacturer's computer system, the company said.

Unicom Display Includes Full Signal Analysis Unit

ATLANTIC CITY — Unicom, Inc. will display a complete signal analysis system, including a minicomputer, and featuring the Model 030FFT processor. The system includes analog-to-digital input, oscilloscope display and utilizes Unicom's own array processing technique. Real-time analysis of voice prints, noise and signals mixed in noise will be performed. Unicom is at booth 214.

Mark Reader Uses Block Print

ATLANTIC CITY — Optical Scanning Corp. is exhibiting the Oscan 17, a low-cost optical mark reader used in the conversion of document information to computerized information. The unit can be used as a line off-line device, i.e., to a keypunch, or as a terminal. It incorporates the block print feature which allows it to perform functions of many OCR readers, the company said. Optical Scanning Corp. is at booth 429.

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Feature Allows Auto-Answering

SKOKIE, IL — Teletype Corp. will show its Model 38 wide-platen ASR terminal associated with the 4210 magnetic tape data terminal at booth 2108.

This remote computing terminal arranges for the user to have access to a wide variety of economy and versatility in the field of remote batch computing. It includes a Teletype 38 with a 15-in. platen which can print 132 char./line. The 4210 terminal can handle data distribution and collection at speeds to 2,400 word/min.

With the automatic rewind feature on

Four Displays Share 4610 Hard-Copy Unit

ATLANTIC CITY — Scheduled to make its first appearance at an SJCC is the Tektronix 613 Storage Display Monitor, a data storage and display unit.

Also appearing at the SJCC at booth 720 are the 4610 Hard-Copy Unit and the 4010 Computer Display Terminal. The company will demonstrate the ability of the 4610 to be used with from one to four displays.

The 4911 Paper Tape Reader/Perforator and the 4912 Digital Cassette Tape Unit are attached to the 4010 terminal.



Tektronix 4010 Terminal and 4610 Hard-Copy Unit

Fast Terminal Ready

ATLANTIC CITY — Executport 1200, an asynchronous serial impact printing terminal with a speed of 120 char/sec will be shown in booth 301 by Computer Transceiver Systems Inc. (CTS).

Executport 1200 is compatible with low- and medium-speed teletypewriters. It can print either a full 132-characters line from a buffer or one character at a time.

In addition to the 120 char/sec setting, the 1200 may be operated at speeds of 10, 15, 30 or 60 char/sec.

The basic Executport 1200 KSR costs \$4,500. Delivery is 90 days.



Executport 1200 terminal has speed of 120 char/sec.

Demonstrations Scheduled For Plug-In Memory Units

ATLANTIC CITY — Data Recall Large Core Storage Laboratories' — the IBM 360/370 360/65 mainframe memory systems for the IBM 370/155 and 370/165 will be demonstrated by the Computer Investors Group, Inc., in booth 8.

The LCS units have capacities up to 8M bytes. Access time on the LCS 65 is 2.5 μ sec, while the LCS 65 has a cycle time of 1.8 μ sec, CIG said.

the 4210, the user can place the unit in an unattended answer mode and receive data at high speed during low line-rate hours, the company said. Once the data has been received, the 4210 will automatically rewind the tape and print the date at 100 word/min.



Model 38 Terminal and 4210 Meg Tape Terminal



Extel Printer

Extel Corp. will show its small, light-weight printer, compatible with established printer codes and capable of speeds to 15 char./sec. at booth 1705. The Series AC printers employ a 50 char./line format on 6-in. paper while the Series AD offers 74 char./line printing on 8-1/2 in. paper. Printing is performed with a 5 by 7 dot matrix directly on pressure-sensitive paper, without the use of ink or ribbons. Three copies can be made.

Digitronics to Show Variety of Devices For Use With Minis

ATLANTIC CITY — Digitronics will display its largest series of peripheral input/output products at booth 2208.

The exhibit will include a demonstration of the 1600 Series IBM-compatible magnetic tape transports, operating through a parallel port; the Model 1608 Controller to a DEC computer.

Another unit now available is the Model MCT-7, a miniature cartridge transport. The Model 2560 Perforated Tape Reader, the latest addition to the Digitronics perforated tape line of equipment, will be unveiled at the exhibit. It operates at speeds of 100 char./sec. or more and can read to 4000 char./sec. reads all commercially available tapes and requires only 3-1/2 in. of panel rack space. The Digitronics Model 101 Big Little Line Printer, compatible with many minicomputers and data terminals, claims the print quality of high-speed printers in a unit a little larger than an electric typewriter.

Face it. There are only three things you can do when the ac power fails:

1. Curse the darkness.

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The Elgar UPS (Uninterruptible Power Source) comes in three sizes: .5kVA, 1kVA, and 2.5kVA. Here's high-quality, no-break power to back up just about any small to medium operation.

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It's maintenance-free. Completely. (Quiet and uncomplaining with no puddles of battery acid to ruin your cordovans).

And the prices start at only \$1500.

If you'd like to hear how it'll back up your operation call Wally Foy collect, (714) 279-0800, 8159 Engineer Road, San Diego, California 92111. After all, swearing at the power company is silly, and playing with matches in the dark can be dangerous.



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Honeywell launches a new attack
on communications and
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The new Honeywell System 700 can turn your computer into a complete information network. Even if your computer isn't a Honeywell computer.

The new Honeywell System 700 is more than a minicomputer, it's a minicomputer system that can be combined into networks capable of carrying on intelligent two-way conversations with hundreds of

data control points — wherever those points may be — on your production line, in scattered departments, or in distant plants.

The new Honeywell System 700 combines hardware and software to become a communications processor, remote line concentrator, terminal controller, sensor multiplexor, store and forward system, peripheral con-

trol system — whatever you need.

Thanks to compatible software, our System 700 builds on the continuing success of our Series 16 minicomputers. And, thanks to the communications and control experience we've gained installing thousands of minicomputer systems, we'll keep your data coming and going, and your System 700 buzzing productively.

The Other Computer Company: **Honeywell**

ICC to Show Full Line of Modems

ATLANTIC CITY — International Communications Corp. will exhibit its line of high-speed modems in booth 114. ICC will feature Modem 4600/48, a 4,800 bit/sec data set with total operation, equalization and circuit testing from one end of the line. Modem 4600/48 is the next generation beyond the ICC Modem 4400/48, presently in wider use worldwide than any other 4,800 bit/sec modem, ICC said.

The ICC exhibit will also feature Modem 4800/72, an adaptive equal-

ized full-duplex data set designed for optimum performance at 7,200 bps over C-1 conditioned lines and dial break-ups at 4,800 bit/sec.

An optional feature is available with the 4800/72 to enable simultaneous transfer of several 2,400 bit/sec data streams. The data set can provide three full-duplex 2,400 bit/sec transmissions over one C-1 conditioned line.

Techtron Communications Terminal Plug Compatible

ATLANTIC CITY — Techtron Inc. will show the 4100 Communications Terminal at booth 1220.

The 4100 is plug-compatible with most data terminals and minicomputers. Featured are switch-selectable speeds from 110 to 2,400 bit/sec, full duplex, full function control, data edit, auto answer and switch-selectable on-line/off-line operation. The 4100 is available in an IBM-coded model for applications with 2741 terminals.



ICC Modem 4600/48

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EDOS IS...

EDOS was developed by The Computer Company to improve the performance and operational characteristics of the IBM Disk Operating System (DOS) on your System/360 or System/370.

EDOS is the new support for the DOS user.

EDOS is a continuing series of system releases offering compatibility with the latest to DOS. Through this, and future releases of EDOS, the current DOS user can continue to receive continuing support and the development of additional integrated enhancements.

EDOS is based on the Extended Disk Operating System. However, it is more:

It is in many cases a logical alternative to OS.

EDOS is modular. Each feature of EDOS is optional, minimizing the storage requirements of EDOS for each installation. The Resident additional storage requirement for most installations is less than 2K.

COMPATIBILITY! PERFORMANCE! INEXPENSIVE!

EDOS is 100% compatible with DOS. All IBM distributed programs and procedures written for DOS will operate under EDOS without modification. No modification to the programs, job control language, data files is required. Programs do not need to be recomplied.

Programs can be run directly from the current version of DOS and then be immediately run under DOS compatibility if you desire.

EDOS features are universal, from the 32K DOS system to the larger users who may be upgrading a DOS system to conversion.

EDOS is extremely easy to install since no changes are required to your current operation.

EDOS is performance. The primary purpose of EDOS is to improve the throughput of your current system. This is accomplished by:

- Additional new features to maximize use of your hardware configuration.

- An improved operating environment for your basic operating system.

- Enhanced functional characteristics of existing tenant systems.

Some installations have realized overall throughput improvements of 25% with EDOS. In addition, EDOS provides unique features, like six partition support, that provide new application opportunities.

EDOS is inexpensive. With all of the features and performance that EDOS provides, its compatibility and ease of installation, we believe you will want to evaluate it in your own environment.

We frankly believe you will agree that EDOS is the most exciting system currently available. A 60 day free evaluation period is provided.

The basic System Release 1 costs \$1,100 (all features except six partition support) has a lease price of \$225.00 per month.

The System Release 4 of EDOS (including six partition support) has a lease price of \$300.00 per month.

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Graphic Terminal And Scan Converter Comprise PEP Show

ATLANTIC CITY — Princeton Electronic Products, Inc. will display the Princeton 801 graphic computer terminal and its high resolution PEP-402 image storage and scan conversion terminal in booth 1610.

The Princeton 801 is a stored image terminal using PEP's Lithicon silicon storage tube, features high-density display of alphanumeric and graphics and selective erase of any picture element. A full range of options is available.

The PEP-402 image storage and scan conversion terminal will also be shown for the first time, featuring 3,000 line limiting resolution per diameter. Ten logarithmic shades of gray can be displayed.

Multigraphics Has Office Copy Devices

ATLANTIC CITY — Multigraphics Division of Multicopy Systems Corp. will exhibit its copy devices in booth 302.

The Continuous Total Copy System will demonstrate the quantity reproduction of computer printout. This system combines an AM 2300 electrostatic copier with reduction capability and a Multilith GTR-2400 microfilm unit to produce 150 copies on ordinary paper.

Also being shown is the AM 5000 office copier that can produce up to 50 dry copy/min on bond-like paper. It is claimed by the firm as the fastest short-run machine on the market. The design for office reproductions 10,000 to 50,000 business documents a month.

Display for Editing

ATLANTIC CITY — Sugarman Lab will demonstrate an intelligent CRT terminal interfaced to a cassette recorder, a hard-copy printer and an upper/lower case typewriter. The demonstration at booth 1012 will be of interest to on-line and off-line computer text-editing users, Sugarman said.

The terminal features full duplex to 9,600 bit/sec, cursor address and inquiry, page flip with scroll, asynchronous and synchronous polling, communications discipline and vector and curve graphics.

Codex Modem Designed For Multipoint Pollled Uses

ATLANTIC CITY — Codex Corp. will show its automatic equalizing 4,800 bit/sec modem, the Codex 4800 Multipoint Modem (Codex 4800-MP), designed specifically for multipoint polled applications.

The auto-equalization time is 50 msec, which approaches the synchronization setup time of manually equalized modems while eliminating the need for manual adjustments, the company said. Price for the Codex 4800 modems begins at \$5,575.

Codex is also showing its 880 Time Division Multiplexer and its 9600 Data Modem at booth 516.

Container Holds 10,000 lb

ATLANTIC CITY — A typical "soft touch" container, designed to provide maximum protection to electronic instruments, computers and machinery during shipping, and its loading apparatus will be displayed by United Air Lines (UAL) at booth 17.

A modified standard jet freighter container, the "soft touch" unit features an integrated tie-down process.

It has a capacity of 10,000 lb and a volume of 457 cu ft.

The "soft touch" system is designed to appeal mainly to the manufacturer or lessor of electronic computer equipment, especially where shipments are less than truckload in size and 1,500 miles or more in distance, UAL said.

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510

Mag Tape Cassette System for Minis

ATLANTIC CITY — Sykes Datronics, Inc., is showing its Compu/Corder 120 system for the first time at booth 221.

The Model 120, an improved version of the Compu/Corder 100 system, has reading speeds of up to 12 in./sec at 1,000 bits/in. The 120 also features greatly reduced interrecord gaps permitting the unit to be used efficiently in applications where short records must be written on tape. The interrecord gap is .1 in. in. 12 in./sec mode and .45 in. at 12 in./sec mode, compared with an interrecord gap of nearly an inch with the Compu/Corder 100, the company said.

The higher transfer rate and shorter interrecord gap make the Compu/Corder 120 system suitable for minicomputer-based business systems.

The Series 2000 Cassette Tape Controller with EIA (RS 232C) interface will also be shown.

The Series 2000 with EIA interface has unattended remote operation, a monitor function which permits simultaneous dis-



Sykes 2220 Cassette Tape Controller
play of information transmitted or received and permits on-line or off-line operation.

Keyboards, Switches, Motors...

ATLANTIC CITY — Conference attendees will see the first East Coast display of several Micro Switch solid-state keyboards, modular key and panel mount solid-state pushbuttons and high-performance dc motors with new digital encoders. General-purpose keyboards, new types of publications and commercial grade toggles and several versions of the "rolling wave" SV switch will also be shown at booths 2223 and 2225.

The 7SSW12 is a solid-state keyboard

with a touch-typing key arrangement that conforms to the U.S. standard for typewriter pairings.

The solid-state modular pushbuttons are the unlighted 101SN and the lighted 201SN.

In addition to the new optical-encoded (digital) high-performance dc motors, Micro Switch will demonstrate lines of analog-controlled motors that can operate from the .75 in./sec tape-drive range of 200 in./sec, most of them available with an encoder.

On display will be two versions of Micro Switch's thin profile "rolling wave" miniature basic switch.

Three versions of the general-purpose SS series of toggle switches will also be shown, including the new 155S with current sinking output and a wide temperature range of operation (-67° to +257° F.).

Micro Switch will exhibit in line of low-cost (under \$2 in. quantities) lighted pushbutton indicator lights.

The 7SSW8 line of miniature toggles has high-quality performance in manually operated commercial grade switches.

Plotter Interface Cuts Commands

ATLANTIC CITY — Houston Instrument has a plotter interface for positive bus PDP-8 Series computers. This plotter interface relieves the software of computing the best incremental straight line between two points and reduces the number of I/O commands to the plotter interface.

This interface is intended only for operational environments where computer

time for driving a plotter is at a premium, and should not be utilized instead of the standard DEC plotter interface when computational time is not critical, the company said.

The plotter interface may be used with any printer having DLT/TTL-compatible inputs. Delivery is 60 days.

Houston Instrument Division of Bausch & Lomb will be at booth 522.

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Remember to call 800-631-7000 for Termicare service (in NJ 800-562-6976). For information on terminals or systems call 800-631-7050 (in NJ 800-529-1170). Or write Western Union Data Services Company, 16 McKee Drive, Mahwah, NJ 07430.

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Terminals Suited For Hard-Copy Use

ATLANTIC CITY — Three new models of the "Silent 700" Electronic Data Terminal, featuring a compact enclosure will be demonstrated by Texas Instruments at booth 2308.

Suited for hard-copy printer applications, the terminals can provide hard copy to hospital printers, monitors, news wire services and video-terminal display systems. The Model 722S, with bit parallel data interface, is appropriate for com-



Silient 700 Electronic Data Terminal puter applications supplying TTL logic levels. The Model 721S, with serial data set interface, and the Model 731S, with serial data signal interface, are compatible with serial requiring EIA, modem or TTL interfacing.

Unit prices for the new models are \$2,490 for the 721S, \$2,175 for the 722S and \$2,415 for the 731S with deliveries in 30 days. Options (includes paper and liquid crystal alphabets, a built-in copy lighting kit and, for the 721S only, a built-in data set).

Librascope Plans Full Line Of L107 Disk Memories

ATLANTIC CITY — The Librascope Division of The Singer Company will exhibit its complete line of L107 disk memories at booth 3.

The latest model of the L107 Series, the L107B, provides up to 16 million bits of storage on 256 tracks. The unit is configured to a 14.7-in. by 9-in. dimensional size.

Models L107A and the militarized L107MA will also be displayed. These models offer up to 7 million bits storage capacity, operating from a 9-in. by 7-in. package design.

All L107 models feature TTL, NRZ interface and are available with either 8.5 or 17 msec average access times at a 2MHz bit rate.

Flying-head-track design contributes to high reliability according the company. It can be used for industrial applications. All L107 disk memories can operate at 10G shock and 2G vibration without special mounting. In addition, the L107MA militarized version meets severe military specifications for altitude, rate, salt and humidity. All models are supplied complete with electronics.

Printer Handles Communications, Computer Output

ATLANTIC CITY — Communications and computer output can now be printed and stored on magnetic tape with the DI-240 magnetic printer from Data Interface, to be shown at booth 309.

The impactless printer, suitable for desktop operation, is smaller than most electric typewriters and prints at speeds



DI-240 Magnetic Printer

up to 240 char/sec. The input data is available for viewing, a line at a time, one-third of a second after it is received, the firm said.

The DI-240 is a solid-state printer. The 96 ASCII characters are formed by a 10 x 12 matrix from a LSI character generator. The font uses upper and lower case and can be changed to Russian, Hebrew or Greek by replacement of an electronic component. Graphics are automatically accommodated by adding an option.

The DI-240 uses thermal paper or high voltage. The unit accepts serial or parallel data entry in Ascii or Baudot code and operates asynchronously at rates up to 50,000 bit/sec.

The printer is compatible with TTL logic or RS-232.

Cassette Recorder Intended for Minis

ATLANTIC CITY — The Raycorder Model 6406, a digital cassette recorder suited for minicomputers and other data product equipment, will be featured in booth 1716. The product of Raymond Electronics Inc., it is designed to provide for maximum up-time and superior performance in digital recording, the firm said.

Bi-directional and unidirectional operation are available with dc capstan drives. Packing density up to 800 bit/in. can be accommodated. Tape speeds are from 3 to 15 in/sec in the transfer mode.



Raycorder Model 6406

Sonex to Feature Modems In Voice Response System

ATLANTIC CITY — A demonstration of a voice response system using a Sonex Model 302 automatic-answer modem will be conducted by Sonex Inc. at booth 2302.

Automatic Touch-Tone modems designed to replace the Bell 401 and 403 units will also be shown. These units can be used in voice response computer systems as well as other on-line systems with Touch-Tone inputs.

Sonex Inc. will exhibit automatic-answer modems. Touch-Tone equipment, data couplers, Bell data set replacements, data access units, multiplexers and OEM equipment.

Fabritek Shows Fast Core

ATLANTIC CITY — A new core memory, the Model 688, will be introduced at booth 2303 by Fabritek Inc.

The high-speed model features a 20-bit word in capacities of 32K (for 64K by 10-bits) on a single 15-in. by 21-1/2-in. board. The memory may be field-expanded to 64K, 128K, 256K or 512K with up to eight modules operating from a single timer and counter assembly.

Full cycle time is 1.2 μsec with a 500-μsec access time. Model 688 architecture is 3D, 3-wire.

Displays Are Multichannel

ATLANTIC CITY — Graphic display systems and plug-in minicomputer memories will share the spotlight at the Data Disc display at booth 1117.

The multichannel graphic display system is designed to provide up to 16 independent display channels to drive low-cost TV monitors in a multiterminal configuration.

The minicomputer disc memories offer capacities from 42K words to 1,536K words for most minicomputers. Access time is 17 μsec and high-speed data transfer rates (to 250,000 word/sec) are featured.

For OEM Uses

RFL Modems Start at 300 bit/sec

ATLANTIC CITY — The RFL Industries line of semi-compatible data modems range from 300 to 2,400 bit/sec. The series includes the RFL DM1300 (Bell 202C compatible), DM1800 (Bell 202D compatible) and DM2400 (Bell 201 compatible).

Each modem is of a printed-circuit card design for OEM applications and is also available in an enclosure that accommodates a modem with power supply for stand-alone versions.

At booth 1716, the RFL DM1300 will be delay and amplitude demodulators, account couplers, FDM data systems, and the Model TM 3000 TDM system. The TDM offers the latest state-of-the-art design including automatic central logic backup; total system monitoring and alarm capability; transmission rates of 4,800, 9,600, 19,200 bit/sec to 240K bit/sec; multiplexed line rate; expansion to 156 channels; code transparent operation and total speed-mixing features, the company said.

These products will be combined with internal page printers and CRT's incorporating 1/4 magnetic tape cassettes, and teletypewriters, offering data systems for specific customer applications.

Card Reader Made For Low-Volume User

ATLANTIC CITY — Documentation will introduce a lower-speed mechanical card reader at booth 2330. The DC-150 is programmed for the lower-volume card user, the firm said.

Designed with a minimum of dynamic parts, the reader has a read rate of up to 150 card/min and a hopper capacity of 500 cards. Currently designed to read punched cards, the reader will be available with the optical mark sense feature as an option in the near future, the firm commented.

Prices start at \$1,500 and delivery is 60 days beginning in August.



Westinghouse 2550 Satellite Processor

Both an intelligent remote-batch terminal and local-batch processor

As a remote-batch terminal, the Westinghouse 2550 Satellite Processor emulates 2709s, HASP multileaving work stations and other popular RJE terminals. No reprogramming of your host processor or front-end system is required.

In addition to this compatibility, the 2550 Satellite Processor increases performance. It improves terminal throughput with higher speed peripherals, faster data rates, data compression, and mass-memory devices for remote spooling.

Offline, the 2550 Satellite Processor provides fast, low-cost batch processing for your scientific, engineering, and business needs. Software support packages include FORTRAN, BASIC, RPG, and numerous assemblers.

Most important, the Westinghouse 2550 Satellite Processor has enthusiastic user acceptance, and is available now! Take advantage of Westinghouse experience as a supplier and as a user. You get single-source leasing, maintenance, and nationwide sales and service. For the answer to your needs, call Westinghouse Computer and Instrumentation Division, Computer Department, Orlando, Florida. 305 843-7030.

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Novar 5-50 and 5-60 terminals record a full day's typing on tape—up to 73,000 characters on a single cartridge—ready for batch transmission at high speeds via telephone line. When transmission is to a Novar 7-70 data collector, the terminals and 7-70 together provide a complete telecommunication system.

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GTE INFORMATION SYSTEMS

Lockheed's SUE Engineered for User

ATLANTIC CITY — The latest computer developed by the Data Products Division of Lockheed Electronics Co., Inc. will be shown at booth 1621. The "System User Engineered" mini-computer (SUE) is designed to permit selection of required system functions by the user engineer.

The SUE minicomputer is con-



Lockheed's SUE
figured from a series of independently operating system modules each on a pluggable circuit card. In addition to a selection of

3M Prepares Disk Cartridges, Packs

ATLANTIC CITY — Featured at the 3M Company Magnetic Products Division booth 2107 will be the Scotch brand 901/902 cartridges.

Another cartridge on display will be the Scotch 903-D disk cartridge which is fully compatible with the IBM disk drive used in System 3 and with the

standard configurations. SUE minicomputer systems can be custom assembled starting from a minimal unit of bus, bus controller, processor and 4K of memory.

Asynchronous communication between modules on a bus board is monitored by a bus controller at 200-nsec intervals allowing direct memory transfers up to 5M word/sec.

Systems users have a choice of four memory modules: two core and two LSI—intermixed in any combination. Core mod-

ules are 4K or 8K by 16 with a standard system capacity of 30K words. LSI modules are 1K x 16; one is a user-customized ROM, the other a RAM memory with 160-nsec access time.

Asynchronous communication between modules on a bus board is monitored by a bus controller at 200-nsec intervals allowing direct memory transfers up to 5M word/sec.

Systems users have a choice of four memory modules: two core and two LSI—intermixed in any combination. Core mod-

600 line/min Printer Set

ATLANTIC CITY — The 400C from Vogeus Instrument Corp., a medium-speed, impact printer, with a carriage width of 132 characters and a print speed of

600 line/min, will be shown at booth 1620. The unit is matched to the latest minicomputer speeds and capabilities.

Also displayed will be the 400C for high-speed telecommunications applications, the company said.

Vogeus provides complete inter-

face, including on-site equipment installation, for DEC PDP-11, PDP-15, Univac 162, 163, Packard HP-2100 Series, Data General Nova; Varsan 620; Honeywell 316 and 516; as well as Western Electric 201 and 202 or equivalent data modems.



Vogeus 400C Printer

Cut programming man-months with

Test 85

A unique program development service using remote batch to a 360/85.

FOR REPRODUCTION



The Novar 7-70 data collector allows any batch computer system with tapes to immediately operate with telprocessing. No expensive communications adapters—no telecommunications package required in your computer—no extra core—no computer processing time lost just to handle phone lines. And you can save up to \$2,000 a month.

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GTE INFORMATION SYSTEMS

XLO Includes Mini in Display

ATLANTIC CITY — XLO Computer Products will introduce, at booth 222, the XLO-8 Minicomputer, the Series 7700 remote batch terminal system and XLO 3301 disk memories and XLO 3322 cartridge drives.

Decision Data Shows 96-Column MFCU

ATLANTIC CITY — Decision Data Computer Corp. will exhibit five members of its family of 96-col card peripherals and auxiliary equipment at booth 409.

The 9650 Multifunction Card Unit (MFCU) will be shown for the first time. The high-performance card peripheral is



9650 Multifunction Card Unit
a fully buffered reader and printing punch with dual input hoppers, a common card path and six output stackers. The 9650 has been specifically designed as a full-function, 96-col card I/O device for OEM applications.

The company noted that the performance, characteristics and cost of the 9650 compare favorably with the 80- and 96-col MFCUs from IBM and are proven in use with both the IBM 360 and the System 3 computers.

The standard 9650 is a free-standing unit consisting of wire-cage and mechanism, power supply, convenient operator panel, basic electronics, data buffers and computer interface. The 9650 sells for \$11,600 with OEM quantity discounts available. Delivery is six months.



Video Terminal

The Centronics Model 401 video terminal will be exhibited in booth 422 as part of the company's exhibit. The company will also show its Model 101 and the Model 101A line printers.

Peripherals Highlighted

ATLANTIC CITY — The Per Data exhibit at booth 1106 will be built around the company's line of minicomputer peripherals including magnetic tape and disk drives and printers.

The company will demonstrate its magnetic tape transport disassembled, stressing simplicity of design and operation.

Per Data's magnetic tape drives use a single design for units with speeds ranging from 25 to 75 ip/sec.

Self Copy Carbonless Paper Makes Up To 12 Legible Copies

ATLANTIC CITY — Self Copy carbonless multi-copy paper, to be shown by Computer Copies Inc., booth 427, can produce up to 12 legible copies on high-speed printers, a minimum of six copies on low-impact terminal printers and up to 20 legible copies on a typewriter.

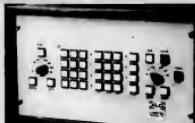
The XLO-8 minicomputer is intended for data communications and process control applications, the company said.

Engineered to function as a medium-size computer, the XLO-8 offers as standard: 64 bytes of expanded memory, 4K bytes of stackable core, I/O interface, seven levels of priority interrupt and 500,000 bytes/sec I/O.

The Series 7700 Communication Terminal System consists of a programmed computer-controlled line printer and a computer-controlled tape reader. The 7700's communication controller has its own main memory core and only memory. The 7700 line printer prints 132 columns at 600 line/min. The card reader reads 300, 80-col card/min.

Options include tape units, teletypewriters, card punches and other peripherals. The 7700 can be configured with the 7700 to give the user a total communications terminal system, the firm said.

The XLO 3301 Disk Memory is a head-per-track storage device offering a capacity of 1M to 10M bits. Its average access time is as low as 8.3 msec, and it has a



XLO Minicomputer

data transfer rate of 2 to 5 Mbit/sec. The 3301 offers many standard features such as self-aligning electronics, non-contact read and pressure filter enclosure for consistent performance.

Large computer technology is also found in the XLO 3322 Cartridge Drive. The 3322 is a positioning-head memory device with a capacity of 75 Mbits in a standard removable disk cartridge configuration. Memory capacity can be increased to 150M bits with an optional fixed disk.

The XLO 3322's average rotational latency is 8.3 msec. Its average head positioning time is 35 msec and its data transfer rate is 6.5 mbit/sec.

Memory Comes As Digital Stack

ATLANTIC CITY — Standard Memories, Inc. will show the "designer choice" from F Series of core memory as a digital stack or as a packaged system for any memory application, at booth 1018.

The Econ F Series is available as a digital stack module in any capacity from 4K by 8 bits up to 16K by 16 bits as a stand-alone system yielding 4K by 8 to 16K by 16 in a 5-1/4 in. enclosure, or a 16K to 64K in a 12-1/4 in. height enclosure.

The Econ F Series is designed to eliminate tradeoffs of size, speed or economy and to offer the widest range of configurations at low price to the designer, the company said.

Circuit Simulation Stated

ATLANTIC CITY — AEDCAP, the computerized electronic circuit simulation system by Softech, Inc., will be demonstrated at the Princeton Electric Products booth 1610.



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2000

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In this supplement our editors will examine the current state of the software field including:

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- Time sharing packages
- DOS enhancement from independent suppliers
- New Software Support to RCA's Spectra users
- Improvements and new packages for small systems
- Application and machine packages

This supplement is must reading for computer users and must advertising for software marketers.

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Printers Avoid Guide Lubricant

ATLANTIC CITY — A line of low-cost, medium-speed impact line printers will be shown at booth 1616 by Odic Computer Systems, Inc. The Series 1300 printers feature impact plastic hammers and characters up to 10 characters per inch, the need for lubrication on the clip guides.

The Series 1300 consists of three models, the 1321, 1322 and 1323, with an average speed from 110 to 250 line/

min. Both ASCII and EBCDIC 7-bit codes are available with 48-, 64- and 96-character fonts. Each character slug can be snapped on or off the carrier belt in seconds, the company said.

The printer is microprocessor-based with logic that automatically examines and adjusts each line to maximum possible speed for particular character content. The units are fully buffered with all electronics included. In most units only a cable is required for interfacing, the company said.

Techtran Terminal Mini-Compatible

ATLANTIC CITY — Techtran Industries will be showing its 4100 Computer Terminal at booth 2220. The Techtran terminal is a plug-in cassette unit that is compatible with most data terminals and minicomputers.

The 4100 features switch-selectable speeds from 110 to 2,400 bits/sec., high-speed serial and parallel I/O, 16K byte edit capability and the ability to rewrite data and to shrink or expand already recorded data files, auto answer for unattended data station operation, switch-selectable on-line/off-line operations and switch-selectable non-printing.

The basic terminal is priced at \$1,650 and is available on a 30-45 day delivery.



Techtran Communications Terminal

Datapro 40 Available

ATLANTIC CITY — Datapro Research Corp. will introduce Datapro 40, a looseleaf publication containing 16 reports on current EDP equipment and technology, at booth 2102.

The reports in Datapro 40 are excerpts from Datapro 70, a three-volume reference service.

The 97-page looseleaf volume includes 97 pages of comparison charts which summarize the characteristics of current minicomputers, modems, optical readers, communications processors and computer output microfilmers.

Other reports discuss independent tape and disk drives, plug-compatible main memory, data processing, data communications facilities, time-sharing services, software package acquisition and EDP conversion planning.

Datapro 70 may be ordered for \$40 until June 1. After that the price will be \$48.50. An optional quarterly updating service is available at an additional cost of \$50 per year.

Facit Shows I/O Typewriters, Tape Readers and Spoolers

ATLANTIC CITY — Facit-Odhner, Inc. will be showing its line of OEM equipment including inexpensive I/O typewriters at booth 1200.

Facit will also be showing paper tape readers, punches, spoolers and reproducers, digital printers and strip printers.

The three typewriters, Facit's 3841 output typewriter, 3851 input typewriter and the 3821 I/O model with drive electronics combining the features of both the 3841 and 3821 units. Basically the same typewriter as Facit's electric office typewriter, they are equipped with additional reed relays, solenoids and photo detectors which enable the units to either transmit or receive or both.

The price of the 3851 is \$1,360; the 3821 Input Typewriter sells for \$940; and the 3841 Output Unit costs \$1,055.



Nortronics Digiwand

Nortronics Digiwand Reads Credit Cards

ATLANTIC CITY — Nortronics Co. will demonstrate two new products at booth 528, the Digiwand and LTC hard-coat development. Also shown will be the company's line of magnetic recording heads.

The Digiwand, a hand-held magnetic wand, is intended to be used with point-of-sale terminals to read magnetically encoded merchandise tags and credit cards that conform to American Banker's Association (ABA) and International Airline Transportation Association (IATA) standards.

The LTC coating (Life Time Ceramic) is used on a line of magnetic heads that are said to provide 10 times normal life.

Other exhibits include read/write cassette heads for 150-bit systems in digital applications, read-after-write cassette heads designed to have reduced crossread characteristics, and a series of 7- and 9-channel dual gap NFG (No Flux Gate) heads for digital applications.

Beehive Terminal Uses Raster Tube Design

ATLANTIC CITY — A versatile new computer system terminal, with increased information display capabilities, made possible through low-cost raster tube technology, will be introduced by Beehive Terminals, at booth 2328.

The Beehive Model V offers independent alphanumeric and graphic displays with internal memory capacity. A stand-alone graphic option on the

Model V is available for Beehive Terminal Models I, II and III, the company said.

The point-and-plot feature of the Model V allows users to plot graphics directly on a graph. Other features of the Model V include automatic hardware interpolation, remote TV drive capability, graphic input rate up to 15,000 points/sec., single graphic and alphanumeric interface and graphic blank capability.

DUO 360/370 shrinks

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Walter Carlson is President of ACM through this May. In a long career in the information business he's formed some pretty savvy conclusions on what it takes to bring fresh thinking into organizations.

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"ACM 72 will be held August 14-16 in Boston. John Donovan has built a superb technical program. We'll have tutorial sessions to bring anyone up-to-speed who doesn't feel comfortable with a specialized topic. Plus debates, mini-tutorials, workshops, joint sessions and a number of other innovations that bring people together on the nitty-gritty of this business.

"This will be the Silver Anniversary Conference for ACM. In addition to our program on current technologies, we'll have the people who formed ACM 25 years ago talking about the ideas that created our industry. Some

of the original concepts discarded long ago are coming back now. Microprogramming, for example. It should be a great conference."

If you're an ACM member, plan to be at ACM 72. If you're not a member, join us there and convert part of your admission fee to annual dues. If you're a data processing executive who's looking for new ideas, send some of your people and encourage them to join ACM.

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CI Notes

AT&T to Unveil 208

ATLANTIC CITY, N.J. — AT&T is planning to announce its 208 date set at the SJCC here next week.

Described as a replacement for the Bell 203 data set, the new model can operate at 4,800 bit/sec and will be limited initially to private line services. The device will have automatic equalization capabilities.

Xerox Completes Diablo Deal

SAN FRANCISCO — Diablo Systems Inc., formerly an ICL-owned manufacturer of computer disk drives and an electronic communications printer, has become a wholly owned subsidiary of Xerox Corp.

Under terms of the acquisition, Xerox is buying 94% of its common shares for all of the common shares of Diablo. It also is issuing an additional 121,000 common shares for all of the Diablo convertible preferred shares, all owned by ICL, which provided the principal financing for Diablo.

Com-Share Injunction Upheld

ANN ARBOR, Mich. — A Federal Court in April upheld a preliminary injunction preventing Computer Complex from developing system software developments made under an agreement with Com-Share to any third parties. Com-Share and Computer Complex had a technical exchange agreement covering the development of software before Computer Complex announced a tie-up with Tymshare. Com-Share sued successfully to bar Computer Complex from passing on any proprietary information to Tymshare.

Aussie Mini Sales Boom

SYDNEY, Australia — Off-the-floor sales to the value of well over \$3 million were recorded during the five-day minicomputer exhibition at the U.S. Trade Center here recently.

Exhibitors estimated that other leads would result in further sales to the value of around \$25 million over the next 12 months.

Supershorts

Telex International Inc. has signed an agreement with Ampex World Operations, S.A., for the exclusive rights to purchase core memory products for leasing in Europe.

The data communications market, which presently commands \$600 million annually, is projected to reach \$6 billion to \$10 billion by 1980, according to University Computing Co.

Peripherals General, Inc., has announced that it will take the sale of Model 844 Universal Controller to Syntel Gesellschaft Fur System-Elektronik MBH & Co. KG of Pforzheim, West Germany. Total value of the sale is over \$200,000 and the units will be interfaced to GE415 systems.

A joint marketing effort for Compu-Charje, Value Computing's machine accounting and billing system, has been signed by Value Computing, Inc. and Capex Corp.

A \$4 million data center owned by GTE Data Services Inc. has been completed and occupied at Marine Del Rey, Calif.

Independents Face Battle

Memory Market Seen Doubling by 1976

By a CIW Staff Writer

The total market for memory equipment — produced both independently and by the mainframe makers — will almost double over the next four years, but the independents will find it hard going, according to Information Data Control.

The total amount of installed memory equipment — main memory, disk units, tape drives and other miscellaneous products — will reach \$32.1 billion by the end of 1976, almost double the \$16.7 billion worth of installed equipment at the end of 1971, the firm says.

Prices Dropping

"The main memory sector will experience the most dramatic change," the firm says. "We're talking about a stabilized increase by 25%, but because prices are going so significantly as to cause the total market sector value to grow by only 9.2%."

During 1971, IDC adds, main memory accounted for 45.5% of the shipments to the total memory market, while disk units supplied 38.4 million. By the end of 1971, the total installed value of main memory was \$8.4 billion, but this will increase to \$16.2 billion by the end of 1976, when installed main memory will account for 50.4% of all installed memory.

In the area of disk drives, IDC says, 32,000 units valued at \$519 million were shipped in 1971, bringing the number of units installed to 135,000 worth \$3.6 billion. By year-end 1977, Overall, disk systems will account for 21.5% of the total memory market at year-end 1971.

Temperature Independent Core

Ampex Claims Memory Advance

MARINA DEL REY, Calif. — Ampex Corp. has developed a temperature independent (Tim) material for computer core memory, the first breakthrough in core technology since the first integrated circuit was made. The new proprietary material can operate over a temperature range of -25°C to +100°C without thermal compensation, according to Eugene Prince, vice-president and general manager of the firm's Computer Products Division.

The new material, according to Victor Sell, senior core product manager, "will permit savings as much as 25% in the design and manufacture of core components, depending on size and application."

Current lithium cores require temperature-compensating electronics to operate consistently, particularly on large storage units, which have critical air flow requirements for performance consistency at all address locations.

By 1976, however, there should be around 165,000 disk units installed in the field with a total value of \$8.3 billion. At that time disk systems will account for 25.7% of the total memory installations.

At present, 2314-type disk drives are clearly the most popular, with 9,000 shipments, valued at \$228 million, during 1971 for a total installed base of \$6,000 units worth \$1.9 billion.

Competition Increases

The number of these units will decline over the next few years as competition increases from the 3330-type drives and other new products. By the end of 1976 IDC estimates that there will be only 60,000 2314-type drives in the field with a value of \$1.7 billion.

Afips Stresses Issues at Joint To Increase Industry Interest

ATLANTIC CITY — The economic conditions to be cited as one of the major reasons for the dropping number of exhibitors at the Joint Computer Conference, April 10-12, will be the impact of the American Federation of Information Processing Societies (Afips) to stir more industry interest in the shows.

The number of exhibitors at next week's spring extravaganza here will be down to around 1,400 from over 2,100 at the last fall in Las Vegas, approximately a 30% drop in the number of exhibiting firms.

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Minis to Benefit

Temperature independence will be particularly critical in environmental, medical and aerospace environments and in sales offices and warehouses, Ampex predicted. With the new units, design costs can be reduced because temperature-compensating electronics can be eliminated, including most thermal sensing devices, seals, sinks and blowers, according to Sell.

A core stack's optimum operating point remains constant, but the operating envelope is unchanged despite temperature variations when using the new material, the firm added, which allows manufacturers to avoid excessive testing and research due to extreme temperature fail-

ures. Presently, the firm said, 18-mm cores made of the new material are in production and have been provided to some customers for use in commercial and government systems.

The firm said the new material will be used in most Ampex memory products sold to computer manufacturers and directly to end users.

Around 5,000 drives of the 3330-type were shipped during 1971, IDC notes, with a total value of \$195 million. The number of units installed will grow by more than 1,000% by the end of 1976. At that time, the 3330-type drives installed are expected to be worth over \$2.9 billion.

In the tape drive area, IDC says 14,000 units of the 3330-type were shipped in 1971, bringing the total year end to 122,000 units worth \$3.7 billion.

By year-end 1976, there will be 165,000 tape drives installed, worth around \$4.7 billion. This is a 35% growth in terms of numbers and a 28% growth in terms of value.

Afips likes to compare spring conference with the previous spring conference, however, instead of with the fall conferences.

But here, too, the comparison looks bad, since the last spring meeting here last year also drew over 200 exhibiting firms.

Smaller Exhibits

In addition to the smaller number of firms exhibiting, the size of the average booth seems to be getting smaller, with most of the large companies dropping out of the joint conferences for more vertical trade shows.

The largest group of exhibitors at last Fall's show — the makers of minicomputers — will also be thinned considerably this year, according to both Hewlett-Packard and Digital Equipment Corporation. Both of these firms had large displays last fall, and Hewlett-Packard had at one time ordered over 20 booths for the spring show before deciding not to exhibit.

Most of the dropouts from the past shows have indicated they will not be out of this spring's exhibit because of either economic or because they would rather show in more vertical exhibits.

Components Shows

"We think the joints are becoming primarily components shows," one mini maker said, "and we would rather put our money into shows that attract end users in specific application areas."

One of the latest trends to reverse this trend was the formation of an industry advisory panel to help make the JCCs more responsive to industry needs.

Its purpose has since been expanded to make Afips itself more capable of responding to those needs.

One of the recommendations of that panel reportedly was to adopt a regional format for the JCCs, whereby there would be three or four localized conferences, and one large national conference per year. The possibility has not been ruled out, Afips said.

Afips' concern with the state of the economy, and Keith Uncapher, president of the organization, will deliver a special state-of-the-industry address on Wednesday morning.

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 COMPUTERWORLD
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Bearinger Named an HIS Vice-President

MINNEAPOLIS — Dr. Van W. Bearinger was named vice-president of science and engineering at Itel Corp.

Associated with the firm's advanced technology activities for 22 years, Bearinger will direct research activities at the Corporate Research Center in Hop-

Executive Corner

kins and the Solid State Electronics Center in Plymouth, Minn.

He is responsible for advising corporate management on promising technical areas and for assuring a close link between corporate research and the company's operating units.

Other Moves

* Potter Instrument Co. has appointed three new vice-presidents. William R. Arnold is vice-president, business planning and development. William L. Koenig, formerly with RCA, was named vice-president, manufacturing, and Sigurd Hoyer vice-president, research and development.

Donald B. Thompson has been appointed chairman and president and chief executive officer of Scan-Optics, Inc. Richard J. Coburn was named corporate vice-president.

* Hugh J. Kern has been elected president and member of the board of Signetics Memory Systems Inc.

* Robert A. Leonard has been named president and chief executive of Compacus Inc.

* J. Thomas Markley is now president of Raytheon Data Systems Co.

* Richard A. Walter has been appointed president and chief executive officer of Scientific Computers, Inc.

* Harrison J. Martell has been appointed president of the Advanced Retail Systems Division of Litton Industries.

* Thomas Cleary has been named manager of business systems administration for the Information Storage Systems Division and Joe D. Foster vice-president.

marketing, of the Data Products Group of Itel Corp.

* E. Richard Williams is vice-president, marketing and support services for Computer Machinery Corp.

* Spencer F. Martin Jr. has become vice-president of Odec Computer Systems, Inc.

* G. Eric Jackson has been elected vice-president, engineering, of Memory Technology, Inc.

* Robert F. Stafford has been appointed director of corporate development at Automatic Data Processing, Inc.

* David S. Andrews has been

named vice-president, marketing for Computer Consoles, Inc.

* L.R. Jeffrey Jr. has been appointed vice-president, marketing, of Data Trends, Inc.

* Andrew C. Knowles has been elected a vice-president and group manager of Digital Equipment Corp.

* Richard E. Bowens has been named vice-president, and Lewis J. Beck vice-president, finance, of Trilog Associates, Inc.

* E.F. Smith has been elected assistant vice-president, operations analysis, of Burroughs Corp.



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Display Area Will Grow Fast, But Study Cites Shake-Out

PENNSAUKEN, N.J. — While the alphanumeric display field is rapidly growing, the market for large displays in the market is declining, according to a report from Alttech Computer Systems, Inc.

The present worldwide installed base of such devices including government installations is 200,000 units, the firm says.

Over the next five years, the report predicts, an additional 800,000 units will be shipped, resulting in an installed base at the end of 1976 of one million units, the firm notes.

The growth in shipments will average approximately 35% annually, Alttech says.

At the same time, the report notes the number of companies supplying displays to the market has already dropped from almost 100 during 1969 and 1970 to between 50 and 60 firms today.

The costs of the equipment used will also drop over the next few years, Alttech adds, predicting a 5% to 10% price reduction per year for each of the next five years.

Presently the primary users of displays are large computer installations, and this will change as more medium and small installations begin utilizing the displays during the next five years, Alttech says.

Small Users Coming

The primary markets for the next two to three years, however, continue to be the top 1,000 companies in the U.S. and the top 1,000 firms overseas. After that, smaller companies will "ever increasingly take advantage of not only lower prices but also the development of systems and software which will address the broadening range of their specific problem areas."

Outside of the U.S., the firm predicts

the use of displays will closely follow the expanding computer markets, with key countries being Canada, the UK, West Germany, Japan, France and Italy.

"It is projected," Alttech adds, "that during the next five years many U.S. companies can expect from 20% to 50% more of their revenues to result from international sales activity."

Manufacturing Growth

The largest user of display terminals by the end of 1976 will be the manufacturing and assembly industries, Alttech states, with 250,000 terminals installed, up from a total of 30,000 today.

This area will be followed by general services with 200,000 terminals, up from 40,000; financial services with 200,000, up from 60,000; special services with 200,000, up from 100,000; and government with 150,000 terminals, up from 45,000.

While the market is large and growing, however, the computer makers are expected to capture the largest share of the market over the next five years, according to the report.

"For the independents," the firm says, "it is expected that they will share in some 200,000 unit shipments over the next five years. These shipments are expected to be captured by the 40 to 50 relatively small alphanumeric display companies using various groups of divisions of other types of companies, including those smaller companies that fail during the next five years."

The small companies in the field presently share only about 15% of the market. Alttech notes that Burroughs, Bunker Ramo and IBM supply about 40%; it explains Raytheon, Uttronics and Sanders split about 30% of the market.

Put Your On-Line System Where Our Mouth Is!

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Data Products Core Memory For Minis Accesses in 250 nsec

WOOLAND HILLS, Calif. — A high-speed, large-capacity core memory system designed for use in minicomputers has been developed by Data Products Corp.

The low-cost Store/336 has an access time of 250 nsec and a cycle time of 650 nsec. Basic capacity is 8K words by 18 bits in a 4.5-in. by 4.5-in. 11-layer package.

The combination of a low price, high speed and large capacity make the Store/336 ideal as a mainframe or add-on memory in the newest minicomputers and other systems being developed today, the company said.

Store/336 can be expanded to 32K by 18 bits in a 5.5-in. chassis, to 64K by 18 bits in an 8.3/4-in. chassis, or to 256K by 18 bits in a daisy-chain configuration.

The basic memory is assembled on three boards and weighs 3 lbs 4 oz.

Additional Store/336 features include low power consumption and low main-

tenance requirements. Reliability is enhanced through 8K sense winding at low component count, the company said. A byte-control feature is optional. Delivery is 90 days.

Computer Automation Adds 'Jumbo' Versions to Naked Mini, Alpha Line

NEWPORT BEACH, Calif. — Computer Automation, Inc. is expanding its OEM systems market with "Jumbo" versions of the Naked Mini and Alpha minicomputers.

Designed to meet OEM requirements for large-scale minicomputer-based systems, the Jumbo minicomputers incorporate up to 32K 16-bit words of core memory and accommodate up to 12 plug-in I/O peripheral interface modules.

The Jumbo computers also incorporate fully parallel port with the instruction set.

Unit prices for the Jumbo Naked Mini with 32K, 16-bit words of core memory are \$11,115 for 200 unit orders and \$13,000 for 10 units. Unit prices for the Jumbo Naked Mini with 4K, 16-bit words are \$2,195 for 200 units and \$2,795 for 10 units.

Computer Automation, Inc. has also announced a new party option and two general-purpose I/O options for the Alpha and Naked Mini CPUs.

Other Products

An MOS encoded keyboard, featuring "N" key rollover and a single 4-pin ceramic MOS chip for the encoding of up to 128 keys, is available from Control Research Corp., Santa Ana, Calif., for general application on computer commandments and data entry terminals.

Motorola has announced the MC68172L and MC68175L dynamic MOS ROMs. 1K-bit memories with a wired-OR capability for memory system expansion in multiples of the 1K by 1-bit array.

The MCM1100 Series of custom-programmable ROMs offers 1K-bit memory capacities of from 2K to 4K bits in a variety of word lengths. Each of the five PMOS, metal-gate ROMs is offered as a custom, mask-programmable memory with additional devices available preprogrammed to standard formats.

A compact amplifier/channel analog switch assembly that fits the space usage of low-level multiplexed systems, the System 620 from Neff Instrument Corp., Duarte, Calif., provides individual amplifiers and filters for up to 64 input channels.

Cyberex, Inc., Willoughby, Ohio, has developed a line of integrated package line voltage regulators for computers, pro-

cess instruments and communications gear.

Two MOS/LSE Core Compatible Modular Memory Cards for small and intermediate memory systems, the AMS 6001 and AMS 6002, from Advanced Memory Systems, Sunnyvale, Calif., are available in capacities from 4K by 8/9 bits to 64K by 16/18 bits, respectively. Cards using the 2K 6003 component have twice the above capacity.

Cogar Corp., Wappingers Falls, N.Y., has high-speed (80 nsec access) 9-channel MOS memory modules of 1K and 2K bits available for immediate delivery. The units are designed to fill the gap between bipolar memories and P-channel modules, the company said.

A 1K-bit MOS dynamic R/A memory from Fairchild Semiconductor can serve as a pin-for-pin replacement for the 1103



Neff 620 Signal Processor

MOS RAM while eliminating critical timing constraints, according to the company.

A multilaminate construction technique used by Display Devices, Inc., Encinitas, Calif., makes low-cost custom-fabricated, light-emitting diode display panels up to 30 in. by 40 in. available.

A series of regulated power supplies from Elexon Power Systems, Irvine, Calif., provides 15 different output voltages from 4 Vdc to 28 Vdc with current ratings of 6A to 1.7A.

The Scotch Brand 8133 digital cassette from 3M Co. meets design standards established by Ami and Ecma and features a fiberglass reinforced housing with interlocking joints.



Data Instruments Cassette Duplicator.

The Librascope Display Control Tracer from the Librascope Division of the Singer Co. is said to provide higher point-to-point resolution without data masking and to save software time.

Microdata Corp., Santa Ana, Calif., has made its general-purpose I/O controllers more intelligent for interface applications are not covered by standard controllers.

The Automatic Audio Cassette Duplicator from Data Instruments Co., Sepulveda, Calif., with rugged construction and operational simplicity, costs \$2,950.

The Datapac 410 Coupler from Ambient Systems, Inc., Santa Clara, Calif., is described as the only solid state instrument coupler for under \$1,000.

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Control Computer Market May Hit \$424 Million in '76

PALO ALTO, Calif. — The market for computer systems in industrial automation equipment is expected to boom, but the number of new entrants and current suppliers with little hope for newcomers, according to a study by Creative Strategies Inc. (CSI) here.

During the next five years, the market will show a compound annual growth rate of 19%, the firm said, growing to \$424 million by 1976.

Growth Potential

Each of the five major markets for control equipment presents obstacles to new entrants, CSI said, and while there is potential for expansion into new market areas for the firms already in the business, there is "little likelihood" of success in the near future for new entrants.

The five major user industries will be petrochemical, metals and minerals processing, electric power generation and distribution, discrete parts manufacturing and other process industries such as pulp and paper and textiles.

Sales of control computers to the electric power industry are expected to grow at a compound annual rate of 28%, and this industry is expected to make increasing use of control computers in hierarchical configurations, the study said.

In the discrete parts manufacturing segment, 70% of numerically controlled machine tools are expected to utilize some form of computer control by 1976, and potential also exists for information — and communications-oriented control computers.

The petrochemical industry application, with heavy emphasis on sophisticated instrumentation, has stimulated significant interest from computer-oriented suppliers such as Foxboro and Honeywell. Revenues from this application are expected to reach \$140 million by 1976.

Among the competitors, Digital Equipment Corp. has a dominant position in the overall market, in terms of both units and revenues.

Measures, as a complete control system, are expected to become the most dynamic growth over the five-year period.

Data General Automation and

While General Automation and Data General will also see significant gains, the firm said.

Trends identified by Creative Strategies include: an increasing implementation of the computer

hierarchy approach; growth in the use of microcomputers and programmable controllers; increasing emphasis on the development of software packages to interface with the control computers; and a shift toward more sales directly to end users.

The control computer industry

is generally characterized by competitive barriers consisting of a required high level of marketing, technological and application expertise, as well as a need for stability in the industry. Thus, it is unlikely that new companies will emerge over the next five years.

Sigma 8 Computers Used To Simulate Air Traffic

ATLANTIC CITY, N.J. — The Federal Aviation Administration has ordered a Xerox Sigma 8 to simulate air traffic conditions as part of a study of the future demands of U.S. air transportation.

The system, valued at \$680,000, joins a Sigma 5 at FAA's National Aviation Facilities Experimental Center here and will permit the running of two or three simulations concurrently.

The major duties of the new system will be the generation of simulated air traffic conditions in real time, and the Sigma 8 will interface with the control system being installed at 21 centers and the Automated Radar Terminal System (Arts-II) which is the traffic control system for airports.

Other Orders & Installations

Nordstrom Best, Inc. retail stores has ordered 200 NCR 280 point-of-sale terminals. Grand Central Stores has ordered 104 NCR 280 terminals.

The Jackson Co., a Birmingham mortgage banking institution, and Kason Hardwear Co., Birmingham, N.Y., have ordered Univac 9214 C systems. Jackson will use the system for mortgage account-

Orders & Installations

ing, investor reporting, mortgage warehousing and insurance accounting. The Kason system will perform order entry, inventory, billing and other accounting procedures.

The Suffolk Cooperative Library System, Bellport, N.Y., has ordered an NCR Century 100 to be used in book acquisitions, circulation control and most accounting functions.

Abraham & Co., a New York brokerage house, has ordered a Univac 9300, and Wyoming Valley Distributing Co., Wilkes-Barre, Pa., has installed a Univac 9200. The 9300 will be used at Research Computers, an Oklahoma City business school and service bureau, and Records Automation, a Frederick, Okla., service bureau.

State Farm Automobile Insurance Co. has purchased the Tape Management Software (TMS) system from University Computing Co.

Virginia Commonwealth Services, Inc. has installed a Burroughs B4700 for demand deposit accounting, mortgages and other applications now processed on two B3500s.

Western Data Associates is installing a Burroughs B2500 to increase administrative services to statewide businesses. Walter E. Heller & Co. has ordered two Burroughs B4700s which will replace two B3500s and support the firm's expanding communications network.

Shared Medical Systems has installed 16 IBM Model 3330 disk drives as replacement drives for 32 Model 2314s.

Photophysics terminals have been installed by Medical Data Systems, Brook Park, Ohio, as the first units of a \$1.7 million order. The terminals, located in doctor's offices, clinics and hospitals, will be linked to a central Univac computer.

The University of Rio Grande do Sul, Brazil, has ordered a Burroughs B6700 valued at about \$1 million. The unit will be used for scientific research, student DP instruction and administrative tasks.

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What could be a major servicing project for you could be little more than an hour's drive for one of our experts.

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So, stop worrying about details. Just sit back and enjoy being only the party of the first part.

For a free invitation, call Chuck Olano at 609-235-7300. Or write to him at GTE Information Systems, Service Division, East Park Drive, Mt. Laurel, N.J. 08057.

GTE INFORMATION SYSTEMS

Nickels & Dimes

Turnaround Division: National CSS registered earnings for the year ended Feb. 29 of \$556,668, or 52 cents a share, compared with last year's loss of \$1.7 million. **SS\$**

Equipment sales to Declim: helped Storage Technology earn \$207,300 for the first quarter ended March 31, compared with a \$1.7 million loss in the same 1971 period. **SS\$**

Scientific Software broke even: with earnings of \$13,477 or 3 cents a share, on the quarter ended Mar. 31, compared with 1971's loss of \$43,000 or 33 cents a share. **SS\$**

Spring dividend time: IBM declared a regular quarterly dividend of 50 cents a share payable June 10 to holders of record May 10. Conraas shareholders of record May 22 will receive 15 cents per share payable June 15. **SS\$**

With the sale of Marshall Data Systems to Mohawk Data Sciences, Marshall Industries incurred an extraordinary loss of \$10.8 million. Marshall has negotiated a plan to restructure its debt. **SS\$**

Demand for the products and services of the forms industry is expected to enjoy a compound annual growth rate of 7% to 8% according to Standard & Poor's. **SS\$**

A complaint has been filed with the SEC alleging that Graphic Arts Data Systems violated provisions of the Securities Act of 1933 in the offer and sale of the firm's stock.

Earnings Reports

COMPIRES
Year Ended Dec. 31
1971 1970
Sbr End 1,442,252 1,442,252
Revenue 4,672,900 \$4,200,160
a-Spec Cred 114,000 174,400
Earnings 1,202,315 36,982
a-Due gain on investments.

CSI COMPUTER SYSTEMS
Year Ended Feb. 29
1972 1971
Sbr End 1,391,204 1,746,412
Revenue 3,191,304 1,746,412
Tax Cred 1,200 1,200
Earnings 2,015 36,982
a-Tax loss carryforward.

COMPUTER SERVICES
Three Months Ended Jan. 31
1972 1971
Sbr End 1,195,416 916,273
Revenue 1,195,416 916,273
Earnings 44,632 127,151
a-Tax Cred 1,200 1,200
Earnings 3,460,317 2,638,700
a-Tax loss carryforward.

UNITED DATA CENTERS
Year Ended Dec. 31
1971 1970
Sbr End 1,321,219 1,321,219
Revenue 3,321,909 2,956,366
Earnings 181,766 149,860

HAZELTINE
Three Months Ended March 31
1972 1971
Sbr End 8,07
Revenue 12,014,000 \$4,574,000
a-Spec Cred 134,000 (21,000)
Earnings 181,766 149,860

a-Consists of \$64,000 tax carryover and \$52,000 gain on property sale.

CLARITY
Three Months Ended March 31
1972 1971
Sbr End 1,57
Revenue 2,459,000 1,919,664
a-Spec Cred 103,000 757,000
Earnings 181,766 774,000

a-Relisted. b-From sale of anticipated future royalties.

Calcomp, 9 Months Up

Memorex Scores Profitable Quarter

SANTA CLARA, Calif. — California Computer Products, Inc. (Calcomp) continued its upward trend in the nine months ended April 2 despite a lagging third quarter, and Memorex showed a profitable first period, after incurring heavy losses in 1971.

Calcomp's nine-month earnings and revenues increased, with revenues totaling \$37 million, up from \$24.7 million in the same 1971 period.

Memorex emerged from the first quarter with earnings of

compared with \$28.3 million, and earnings rising to \$1.7 million, or 65 cents a share, from \$1.6 million, or 70 cents a share.

Although revenues rose 10 percent to \$11.5 million from \$8.5 million in the same period last year, earnings declined to \$476,000 from \$570,000.

Memorex emerged from the first quarter with earnings of

\$53 cents a share, compared with the loss of \$556,000 of 15 cents a share in the 1971 six months.

The improved three-month performance at Codex was enough to offset the losses at Calcomp and the firm cut its six-month loss.

In the quarter, revenues rose to \$863,389 from \$692,495 and earnings, aided by an extraordinary credit of \$27,349, climbed to \$70,191 from the 1971 quarter's loss of \$51,991, or 14 cents a share.

Revenue for the six months declined to \$1.4 million from \$1.9 million, but the loss was cut to \$82,294 or 6 cents a share, from \$28,949 or 28 cents a share.

Graham 9-Month Sales Set Record

GRAHAM, Texas — Nine-month sales and pretax earnings set new records at Graham Magnetic, Inc., but reflecting the exhaustion of tax credits, earnings declined.

Sales for the period ended March 31 soared 22% to \$6.9 million from \$5.7 million in the same period last year.

Income before taxes and spe-

cial items climbed to \$895,348 or 50% above the \$594,517 in the comparable period of 1971. But bottom-line earnings rose \$661,349, or 85 cents a share, compared with \$687,102, or \$1.03 in the comparable 1971 period when no taxes were applicable, and when extraordinary items totaled \$372,858.

In the third quarter, sales rose to \$2.5 million from \$1.8 million, and pretax earnings and special items reaching \$326,857 compared with \$190,495 in the same 1971 period.

Earnings fell to \$173,057 from \$209,460 in the yearago quarter. This was the first period in which full tax credits were available. Special credits available for the period totaled \$3,600, while in the same 1971 quarter they totaled \$127,165.

TBS COMPUTER CENTERS
Year Ended Feb. 29

1972 1971

Sbr End 1,442,252 1,442,252

Revenue 3,885,119 \$3,651,792

Earnings 259,024 (236,953)

INTAC
Three Months Ended March 31
1972 1971

Sbr End 1,119,996 1,119,996

Revenue 1,119,996 1,119,996

Earnings 1,000 1,000

TRACOR COMPUTING
Year Ended Dec. 31

1971 1970

Sbr End 1,02
Revenue 8,231,000 \$7,380,000

a-Tax loss carryforward credit. b-Gain from sale of "know-how."

COMTEST
Year Ended Dec. 31

1972 1971

Sbr End 1,02
Revenue 8,300,000 \$7,380,000

a-Tax loss carryforward credit. b-Gain from sale of "know-how."

CONCAC
Three Months Ended March 31
1972 1971

Sbr End 1,02
Revenue 12,014,000 \$4,574,000

a-Spec Cred 134,000 (21,000)

Earnings 181,766 149,860

a-Relisted. b-From sale of anticipated future royalties.

COMPUTERWORLD
Year Ended Dec. 31

1972 1971

Sbr End 1,02
Revenue 8,300,000 \$7,380,000

a-Spec Cred 134,000 (21,000)

Earnings 181,766 149,860

a-Relisted. b-From sale of anticipated future royalties.

CONCAC
Three Months Ended March 31
1972 1971

Sbr End 1,02
Revenue 12,014,000 \$4,574,000

a-Spec Cred 134,000 (21,000)

Earnings 181,766 149,860

a-Relisted. b-From sale of anticipated future royalties.

COMTEST
Year Ended Dec. 31

1972 1971

Sbr End 1,02
Revenue 8,300,000 \$7,380,000

a-Spec Cred 134,000 (21,000)

Earnings 181,766 149,860

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1972 1971

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SEC Bill Seeks 'Total System' Approach

NEW YORK — The capability to undertake a "total system" approach for the handling and settlement of securities transactions is the goal of the Securities Transaction Regulation Act of 1972, proposed by the Securities and Exchange Commission (SEC).

The legislation would permit

the SEC to determine the form of the stock certificate and give the agency broad authority over broker-dealer back-office operations, including computer operations.

The proposed bill would have the commission set standards and procedures for stock-processing firms in performance, operation, compatibility with other exchanges. It would also allow SEC to set policies for nondiscriminatory access to facilities and standards for the safety of cash and securities.

Another SEC plan to facilitate coordinated trading of securities has drawn criticism from Rep. John Moss (D-Calif.), chairman of a House Commerce Subcommittee studying the securities industry.

Under the SEC plan for a centralized stock transaction tape, the agency would require all

stock exchanges and the National Association of Securities Dealers to make available to computerized stock information systems the daily price and volume of all stocks traded in securities transactions traded in the different markets.

The SEC also proposes to require all stock exchange specialists and over-the-counter market makers to disclose publicly their bid and asked quotations on listed stocks.

Moss said he was troubled by the lack of agreement within the industry on who should operate an eventual centralized computerized tickers, tape, and sale. The SEC should "more diligently examine" the structure of a combined tape and the information it should contain.

Quote System Lets Brokers Inspect Different Markets

NEW YORK — Brokers will soon be able to survey a composite picture of prices for stocks listed on more than one exchange with Bunker-Ramo's Market Montage System.

The system retrieves data from a central computer linked to the tickers of the various exchanges and displays the price of each trade, current bid and asked prices and volume of transactions of stocks listed on different exchanges. It also shows current quotations on the OTC market.

The Market Montage will allow brokers to "go shopping for the best prices for their customers," according to John J. Haberstroh, marketing vice-president.

The Market Montage was proposed by a group of brokers to negotiate a proposal for a consolidated market tape that would report all transactions on all stock exchanges.

The system is expected to be available this fall.

Amex System To Link Trading

NEW YORK — The American Stock Exchange has been showing its version of a computerized trading, quotation, order-handling and reporting system called Amodeo.

The computer-based system would allow market makers or specialists in securities traded on any exchange to submit competitive prices into the system. Orders originating from branch offices could be routed to the market maker offering the best competitive price, developers said.

Also, orders could be automatically executed through the system, with trade data flashed over the eye-burn national stock ticker.

Customers and brokers could still direct orders to the market of their choice, even if that market didn't offer the best price.

Price quotations of specialists would be displayed on terminal screens, so each specialist could see his competitor's quotes.

The estimated cost of a national trade system would be about \$25 million to \$30 million, sources indicate.

New Registrations

INTEL CORP., 3065 Bowers Ave., Santa Clara, Calif., has filed a regular voluntary registration, filed to register 37,881 shares of common, to be sold at \$22.65 per share maximum.

STANDARD COMPUTER CORP., 647 E. Yeager St., Santa Ana, Calif., a service bureau, filed to register 1,000 shares of common, to be offered for sale at \$1 per share maximum.

WILLIAMSBURG DATA PROCESSING CORP., 7440 Tidewater Drive, Norfolk, Va., a DP service bureau, filed to register 430,000 shares of common. Proceeds, at \$1 per share maximum, are to be used to acquire equipment and for working capital. The underwriters are D.H. Webster & Co., Inc., 10 Wall Street, New York, N.Y. 10005.

MCI COMMUNICATIONS CORP., 1000 Rockville Pike, Bethesda, Md., a specialized common carrier, filed to register 3 million shares of common. Proceeds, at \$1 per share maximum, are intended for construction of communications systems. The underwriters are Bryan & Co., Inc., 14 Wall St., New York, N.Y. 10005.

DATUM RECALL CDRP, 142 Oregon St., El Segundo, Calif., filed to register 329,654 shares of common. Proceeds, at \$1 per share maximum, intended for research and development and for working capital. The underwriters are Kennedy & Gardner Inc., 606 S. Olive St., Los Angeles, Calif. 90014.

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Computerworld Stock Trading Summary

All statistics
compiled, computed
and formulated by
TRADE QUOTES, INC.
Concord, Mass. 01748

Earnings Reports

SYS COMPUTER	Year Ended Dec. 31
Revenue	\$197,100 1970
Spec Item	\$804,512 \$351,201
Expn	2,640 2,640
Earnings	2,640 (\$66,026)

a-Credit, d-Guaranty

TEKTRONIX	Year Ended March 4
Revenue	1971 1970
Spec Item	\$8,45 6,33
Expn	49,100 43,097,000
Spec Cred	825,000 626,000
Earnings	3,633,000 2,640,000

COMPUTER INSTRUMENTS	Year Ended Dec. 31
Revenue	1971 1970
Spec Item	\$8,45 6,33
Expn	8,45 6,33
Spec Cred	825,000 626,000
Earnings	3,633,000 2,640,000

b-Credit, d-Guaranty

DATA GENERAL

Three Months Ended March 11

DATA GENERAL	Year Ended Dec. 31
Revenue	1971 1970
Spec Item	\$1,31 4,13
Expn	8,385,000 2,864,000
Mo Shr	.58 .24
Revenue	11,419,000 5,012,000
Spec Item	1,31 4,13

b-Credit, d-Guaranty

COMPUTER CONSOLES

Year Ended Dec. 31

COMPUTER CONSOLES	Year Ended Dec. 31
Revenue	1971 1970
Spec Item	\$1,31 4,13
Expn	8,385,000 2,864,000
Mo Shr	.58 .24
Revenue	11,419,000 5,012,000
Spec Item	1,31 4,13

b-Credit, d-Guaranty

DATA 100

Year Ended Dec. 31

DATA 100	Year Ended Dec. 31
Revenue	1971 1970
Spec Item	\$1,31 4,13
Expn	8,385,000 2,864,000
Mo Shr	.58 .24
Revenue	11,419,000 5,012,000
Spec Item	1,31 4,13

b-Credit, d-Guaranty

ITEL

Year Ended Dec. 31

ITEL	Year Ended Dec. 31
Revenue	1971 1970
Spec Item	\$1,31 4,13
Expn	10,130,000 81,285,000
Mo Shr	.58 .24
Revenue	12,723,000 1,029,000
Spec Item	1,31 4,13

b-Credit, d-Guaranty

ALANTHUS

Six Months Ended Feb. 29

ALANTHUS	Six Months Ended Feb. 29
Revenue	+1972 +1971
Spec Item	8,59
Expn	1,346,815
Loss	879,249 128,895

+Pro forma to reflect effect of prior year of change in accounting principle.

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